

**B777 IOE & Training Reference Guide***Updated as of 5-15-2011**Current Update – No Change – Not Updated***TRAINING REQUIREMENTS:**

CHECK: license, medica, passport/visas, pubs for planned route, plus Captains specific US Domestic Jepps.

**IOE:****FDAG 6.9.1 / 4-1-11****Initial / Upgrade OE Requirements (FAR 121.434)**

CA: 25 hours\* / 4 cycles / 2 as PF / reducible to 12 by landings.

\*These hours may not be reduced by landing credit. The F/O may not take credit for observation time. During OE training, the Captain & F/O must complete 4 operating cycles (at least 2 as the pilot flying the airplane) before OE is considered satisfactorily complete.

Note: An Operating Cycle is defined as a complete flight segment consisting of a Takeoff, Climb,

**FDAG 6.9.2 Transition Operating Experience Requirements (FAR121.434)**

Transition Operating Experience will consist of the following:

Category	Required Hours
Captain	25 hours*
First Officers	15 hours

\* For Transition Captains these hours may be reduced by as much as 50%. This reduction is calculated by excluding the first takeoff and landing and thereafter reducing the required hours by one hour for each subsequent takeoff and landing. In other words, the number of required hours for Captains could be reduced to as low as thirteen (13) hours, if 12 takeoffs and landings were also accomplished in addition to the initial takeoff and landing.

The Captain & F/O must complete 4 operating cycles (at least 2 as the pilot flying the airplane) before

Operating Experience is considered satisfactorily complete.

**Captains**

A Pilot Check Airman must act as PIC and occupy the First Officer's seat for a Captain's entire Operating Experience training.

**First Officers**

These hours may *not* be reduced by landing credit. The F/O may not take credit for observation time. A First Officer must perform second-in-command duties in the right seat under the supervision of a Pilot Check Airman who will occupy the left seat.

**Autoland Qual:**

Each CA must complete two actual autolands during the first 100 hours in the A/C. Autolands accomplished during IOE count.

To view: HI\*E/EQUIP/CA/E

To log: HICAT3/777/DTE/DTE

Once entered, subsequent entries are not required.

**FDAG 6.9.3 Initial/Transition/Upgrade General Policies and Procedures / 4-1-11**

The Pilot Check Airman will occupy the First Officer station throughout the entire Captain OE phase. During OE, the Check Airman imparts his/her accumulated knowledge concerning line operations to the upgrading crewmember. Such knowledge should be passed in an orderly manner starting with the flow of work in operations and continuing to the aircraft. When possible, the crewmember should be thoroughly briefed on what to expect prior to encountering each aspect of the flight operation. Particular attention should be paid to the new Captain's takeoff briefing, procedures, and crew resource management, to include Flight Attendant interface. Every effort should be made to encourage the new Captain to make decisions affecting the flight. Crewmembers must be able to demonstrate proficiency in all phases of flight prior to completion of Operating Experience.

**Additional Operating Experience Time**

\*There have been several instances in which crewmembers have exceeded the normal Operating Experience flying time requirements and the Flight Management was not aware of the pilot's progress. It is essential that crewmembers with slower than normal progress be identified and their progress reported as early as possible.

\*When a Check Airman first becomes aware of a situation in which a crewmember will exceed the minimum Operating Experience flying time requirements, the Check Airman must immediately notify the crewmember's Fleet Captain, Chief Pilot, and Flight Standards Scheduling. In addition, this slower than normal progress should be documented in the Operating Experience worksheet for the next Check Airman. Appropriate evaluation and recommendations are key elements in determining additional training.

\*Slower than normal progress is defined as, but not limited to, a crewmember requiring more than the FAR required hours.

\*Compliance with this policy will ensure that:

\*Flight Management is aware of any potential problem

\*Prompt corrective action is taken

\*Efficient completion of Operating Experience is assured

• The Manager Flight Standards Scheduling will periodically send out a report updating the status of pilots requiring additional operating experience.

**Operating Experience Data Collection**

At the completion of the first operational leg of Operating Experience a data collection form ("Line Check" Bubble Sheet)

must be completed. This data collection will give Flight Training the ability to assess the proficiency of pilots leaving the schoolhouse and entering the line environment and in turn, assess their training program. The criteria for evaluating each maneuver or phase of flight are contained in the AQP Pilot Qualification Standards. By applying those standards, we fully expect that pilots may be debriefed on a significant number of items and may lack proficiency on others. This data will provide trend information to allow fleets to revise training programs.

**CONSOLIDATION:**

100 hrs. within 120 days after LOE, or 150 days if by day 120 refresher training or line check is given

Fly 2 CAT III approaches during consolidation.

To log CAT III: HICAT3/777/DDMM/DDMM

Div Qual = HID

Training/Landings = \*E/EMP#/777/CA (or FO)

**FM I, 3-3.3 / 3-15-11****3.3.3 Consolidation of Knowledge and Skills**

Reference: 14 CFR 121.434

A. Pilots must each acquire at least 100 hours of line operating flight time, including operating experience, for consolidation of knowledge and skills within 120 days after successful completion of the qualification simulator LOE. In an augmented crew, the flying time will be apportioned among all crewmembers for purposes of calculating consolidation time. Captains who have 100 hours as F/O in the specific aircraft type are automatically consolidated. If before completing the 100 hours, the pilot serves as a flight crewmember in another aircraft type, that pilot may not return to the consolidation aircraft until satisfactorily completing refresher training.

B. If a pilot fails to acquire 100 hours, within 120 days, the consolidation period can be extended to 150 days if, on or before the 120th day, the pilot completes refresher training or a check airman determines that the pilot is proficient by conducting a line check. If the pilot exceeds 120 days (or 150 days with an extension) without completing the 100 hours of consolidation, the pilot becomes unqualified and may not serve in that position until completing the appropriate requalification training (including a proficiency check). Completion of the requalification proficiency check will start a new consolidation period with the same rules (previous flight time will not be credited).

C. Rules concerning consolidation flight hours may be waived by the FAA Administrator

**FDAG 6.10 Consolidation of Knowledge and Skills****(FAR 121.434) / 4-1-11****6.10.1 Requirements**

Pilots must each acquire at least 100 hours of line operating flight time for consolidation of knowledge and skills, (operating experience hours are included), within 120 days after the successful completion of the LOE.

#### FDAG 6.10.2 Exceptions

\* Pilots who have qualified and served as Captain or F/O on a particular type aircraft before August 1, 1995 are not required to complete the line operating flight time for consolidation of knowledge and skills.

\* Pilots who have completed the line operating flight time requirement for consolidation while serving as F/O on a particular type A/C are not required to repeat the consolidation hours before serving as Captain on the same type airplane (Upgrade).

\* If, before completing the required 100 hours, a *pilot serves as a pilot in another airplane type*, the pilot may not serve as a pilot in the airplane for which the pilot has newly qualified unless the pilot satisfactorily completes refresher training. The amount of training provided is dependent on the length of time the individual last performed those duties on that type equipment.

#### FDAG 6.10.3 Refresher Training

The ground training will be dependent upon the individual trainee's knowledge of aircraft systems and procedures as determined by a review through discussion with his manager and instructor. As a minimum, a 2-hour simulator or 1 hour aircraft training session conducted by a simulator instructor or check airman, respectively, will be conducted to assure reacquisition of the knowledge and skills required to maintain an adequate level of proficiency, in that crew position, for the given type airplane.

At least three (3) takeoffs and landings must be completed.

#### FDAG 6.10.4 Extending the 120 Days

If the pilot fails to Consolidate Skills (100 hours in 120 days), an extension to 150 days may be granted if the following conditions are met:

\* Pilot still meets all applicable qualification requirements and:

\* On or before the 120th day, the pilot completes refresher training conducted by an instructor, OR a Check Airman determines through supervised line observation flight (Line Check) that the pilot is proficient.

#### FDAG .10.5 Consolidation Requalification:

If before completing the 100 hours, the pilot exceeds the 120 days without completing the refresher training or line check first, or exceeds 150 days (with the extension), the pilot becomes *unqualified* and may not serve in that position until completing the appropriate *requalification training* in accordance with the approved requalification training curriculum (to include the proficiency check) for the pilot position on that type aircraft. In this case, another 120 days for completing *another* 100 hours will begin from the date of the completed proficiency check. The

hours previously completed in that position will *not* be credited toward the new 100 hours requirement.

### INTERRUPTIONS AND DELAYS TO THE IOE:

#### FDAG 6.9.3 / 4-1-11

#### \*Interruptions and Delays to the Operating Experience:

Pilots must acquire at least 100 hrs of line operating flight time, to include operating experience time, within 120 days after the satisfactory completion of their check under FAR 121.434 (see Consolidation). However, if the pilot serves as a pilot on another type aircraft prior to completing the 100 hours, the pilot must receive the refresher training IAW the consolidation of knowledge and skills rule as defined in American Airlines' Advanced Qualification Program (AQP). When the interruption or delay is caused by other than flying another type aircraft prior to completing the Operating Experience, the following guidance will apply:

- A crewmember that is unable to begin Operating Experience within 21 days after the completion of the Advanced Simulator will be scheduled for refresher training prior to beginning his Operating Experience. Crew Qualifications will advise the appropriate Fleet Captain of the above interruptions. The type of refresher training shall be determined by the Fleet Captain, after reviewing the pilots training records. The refresher training may include line observation, additional simulator, or a pilot trainer airplane.
- A pilot who begins the required Operating Experience and the Operating Experience was interrupted for reasons other than flying another type aircraft, may be allowed to complete the Operating Experience without any refresher training. However, if the interruption is more than 45 days, refresher training will be required. The type of refresher training shall be determined by the Fleet Captain, after reviewing the pilots training records. The refresher training may include line observation, additional simulator, or a pilot trainer airplane. Following an interruption or delay, and upon resumption of the Operating Experience, a pilot shall be scheduled to completion.

### CHECK AIRMEN:

#### FDAG 6.9.3 Aircraft/Flight Release Responsibility During Operating Experience / 4-1-11

On all Operating Experience flights, Mandatory Line Checks, or Division Qualifications, the Pilot Check Airman is the Captain of record and must sign the flight release. When required during emergencies or for safety reasons, the Check Airman will assume the duties and responsibilities of the Captain.

### Check Airman Responsibility

It should be clearly understood that the Operating Experience training requirements are a minimum, and that it is the Check Airman's responsibility to determine when a crewmember is competent to assume his or her duties. Anytime it becomes evident that the qualifying crewmember is not making satisfactory progress, the Check Airman will notify the appropriate Fleet Captain and crewmember's Base Chief Pilot who will coordinate any required additional training. Prior to conducting the Operating Experience, each Check Airman will thoroughly review the appropriate qualification worksheet and the detailed instructions found in the Check Airman Guide. Upon completion of the Operating Experience, the Check Airman will complete the worksheet.

### DISPLACED CREW MEMBER:

#### FDAG 6.9.3 / 4/1/11

The necessity of retaining a displaced crewmember on board during the OE phase will normally be determined by the Check Airman. In certain cases the Managing Director Operations, in coordination with the crewmember's Base Chief Pilot, may require the displaced crewmember to remain aboard during OE. In every case, the decision to allow a displaced crewmember to remain at home should not be automatic and will always be coordinated with crew qualification regardless of what decision is made.

### LINE CHECKS: PIC:

#### Pilot In Command (PIC) Line Check Requirements:

#### FDAG 6.11.2 / 4-1-11

Line checks should normally be conducted from the jump seat. Each PIC will perform the duties and responsibilities of a PIC in one of the types of airplanes in which he or she is qualified. The Captain receiving the check may serve as either PF or PNF. This check must be accomplished over a typical part of an AA route, foreign or federal airway, or over a direct route. The check must be given by a Pilot Check Airman who is currently equipment and route qualified. This requirement gives the Check Airman an opportunity to observe and critique "Crew Resource Management". The line check on either B-757 or B-767 satisfies the requirement for both aircraft types.

NOTE: When a Captain loses qualification due to lack of a line check, the Check Airman must sign the flight release and occupy the First Officer's seat. The necessity of retaining the displaced First Officer aboard during the line check will normally be determined by the Check Airman.

#### Line Check Evaluation Focus

The line check evaluation incorporates an evaluation of Human Factors and Safety Training practices, as well as a technical skill assessment of the full crew. The focus for line checks will be on

the crew rather than individual performance. A full debrief facilitated by the Check Airman will be conducted followed by completion of a blind data collection form on the entire crew. Data collected will include ratings and reason codes on specific maneuvers.

#### Frequency

##### \*Continuing Qualification Line Checks

Under the Continuing Qualification AQP program, line checks may be administered to PICs on a scheduled/unscheduled basis with mandatory line checks to ensure that no PIC would exceed 24 months (plus 1 grace month) without a line check. Fifty (50) percent of all Captains must receive a line check per calendar year. See FAR121.915(b)(2)(ii). However, dual qualified PIC's require a line check every 12 months on one of the aircraft types the pilot is to fly. In addition, satisfactory completion of a Requalification OE will also satisfy the requirements for the Continuing Qualification line check.

#### LINE CHECKS: AGE 60 AND ABOVE (OLC):

##### FDAG 6.11.3 Age 60 and Above CA and FO Line Check Requirements / 4-1-11

Both Captains and First Officers age 60 and above are required to have a Line Check every 6 (six) Months. When the pilot turns 60, he or she must have had a Line Check within the last six months, or he/she will become non-current. Note: there is no provision made in this rule for "end of month" or "grace" month allowances with these Over 60 Line Checks.

##### 1st example:

A pilot turns 60 on March 25th, 2008. That pilot must have had a line check on or after September 25th 2007 to be current. (He/she turned age 60, so must have had a Line Check within the last six months).

##### 2nd example:

A pilot turns 60 on March 30th, 2008. That pilot last received a Line Check on January 12th, 2008.

Because of the 6 month rule, this pilot must receive another Line Check on or before June 11th, 2008 to remain current.

To satisfy this regulation there are two Line Check requirements:

1. Check Airmen are required, (when giving a Captain a regular Line Check), to **ALSO GIVE THE FIRST OFFICER A LINE CHECK, if he/she is 59.5 years of age or greater.**
2. When giving a First Officer an Over 60 Line Check, **ALWAYS give the Captain a line check - regardless of age.**

NOTE: a FIRST OFFICER's attendance at the Flight Academy for Recurrent training (R9/18), or for Takeoff and Landing Currency, will count towards this Line Check requirement.

##### FDAG .11.4 Line Check Worksheet/Data Collection Form

All Line Checks are also reported via a Line Check Worksheet/Data Collection Form (Bubble Sheet). **When completed, this form should be sent by board mail to SCAN Data, MD 871, and GSWFA, as directed on the form.**

##### FDAG 6.11.5 Requalification Line Check

This type of Line Check is necessary when a Captain has not had a line check during the preceding twenty-five (25) months (24 plus 1 grace month) under the AQP program, or for some other reason has lost his equipment qualifications. However, satisfactory completion of a Requalification OE will also satisfy the requirements for the Continuing Qualification line check. In addition, the Check Airman must sign the release and occupy the copilot's seat since the Captain is no longer qualified to act as PIC until the successful completion of the check.

##### FDAG 6.11.7 Special Line Check

A Special Line Check is a line check requested by flight management to accomplish specific training and checking, usually tailored to a specific crewmember requirement. This Check is reported via the Line Check Report (see section 5.3) using the remarks section to comment on specific or special circumstances involved in the particular line check. **Additionally, contact the Manager requesting the check immediately following its completion.**

##### 6.11.8 International Line Check

Captains who fly over a route or area that requires an International qualification may qualify by accomplishing an international line check. This check may also serve to satisfy the requirement for the line check under AA's AQP program. The International line check requirement is actually generated because of the special type of navigation used. However, under AQP, American Airlines has defined its International operations by "Division" rather than routes requiring a special type of navigation. American Airlines AQP Program allows for International Line Checks on a 24 month basis. See FAR 121.915(b)(2)(ii). **International Captains will receive a biennial line check using the applicable special type of navigation system by flying over a trans-oceanic route or area as PIC under the supervision of a Check Airman.**

\* PIC's who are dual qualified require a line check every 12 months on one of the aircraft types the pilot is to fly.

\* **PIC's who are qualified in more than one division need not have a line check in each division, but must, within the preceding 12 months (plus one grace month) fly in at least one international division in which qualified as an active crewmember.**

\* An International line check will satisfy the requirement for a domestic line check; however, a domestic line check will not fulfill the International line check requirement.

\* Upon completion of the line check, the Check Airman will complete the computer generated message to Crew Qualifications. Crew Qualifications will then enter the completed line check into the CREWS system.

#### AGE 60 ICAO FLIGHT DECK REQUIREMENT:

##### FMI 17.7-1 / 3-15-11

##### 17.7.2 Pilots Age 60 or Older

Reference: 149 USC 44729; FAA InFO 08001; ICAO Annex 1, Para 2.1.10.1 and ICAO Annex 1, Amendment 167 Subject to the following limitations a pilot may serve in Part 121 operations until attaining 65 years of age. For purposes of age 60 and over requirements, a domestic operation is a flight between two domestic stations, which includes flights from the continental US to Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, and Guam. All other scheduled operations are international.

##### A. Domestic Operations

Both the Captain and First Officer may be over age 60.

##### B. Two Pilot (Unaugmented) International Operations

One pilot under age 60 must be part of the crew for all two pilot (unaugmented) international operations.

##### C. Augmented International Operations

1. One pilot under age 60 must be part of the crew for all augmented international operations.

2. **It is always acceptable for two pilots over age 60 to occupy the primary flight control positions when operating above 10,000 feet AGL.**

3. **For arrivals and departures at an international station FAA and ICAO recommend that during high workload phases of flight (such as flight below 10,000 feet above ground level) at least one pilot seated at the controls (a crew duty position) should be less than 60 years of age.** PICs should use careful crew management to ensure maximum compliance with this recommendation.

#### **NOTE**

##### **Exceptions to this recommendation are authorized when:**

- The Captain directs otherwise to ensure that a First Officer's recency of experience or landing currency is maintained.
- Required training, line check or qualification for Operational Experience is being conducted by a qualified Check Airman

**RESTRICTED CAPTAINS:**FM1 4.2-1 / 3-15-11**4.2.1 Restricted Captains**

Reference: 14 CFR 121.652

**A. Definition**

A restricted Captain is a Captain with less than 300 hours total PIC with American Airlines or less than 100 hours PIC in aircraft type. Calculation of PIC hours for restricted Captains is subject to the following constraints:

1. The required 100 hours PIC in aircraft type cannot include operating experience time.
2. If the Captain has at least 100 hours total PIC in other AA aircraft types, the required 100 hours PIC in aircraft type may be reduced not to exceed 50% by substituting one landing for one hour of PIC time in aircraft type.
3. The required 300 hours total PIC with American may not be reduced by landing substitution.

**B. Restrictions**

The following restrictions apply unless using FAA Exemption 5549 (paragraph C below) or unless a qualified Check Airman occupies the First Officer seat.

**1. CAT II / III Approach Restriction**

A Captain with less than 100 hours PIC in aircraft type OR less than 300 hours total PIC with American may not conduct CAT II or CAT III Approaches.

**2. CAT I and Non-ILS Approach Restriction**

a) Destination Airport - A Captain with less than 100 hours PIC in aircraft type must add 100 feet to the published MDA or DH and one half mile (or the RVR equivalent) to the published visibility minima.

The following table will aid in visibility minima additions.

1800 or 1/2 4500 or 1  
 2000 or 1/2 4500 or 1  
 2400 or 1/2 5000 or 1  
 3000 or 3/4 5000 or 1 1/4  
 4000 or 3/4 6000 or 1 1/4  
 5000 or 1 6000 or 1 1/2

b) Alternate Airport - Published minima need not be increased, but the lowest allowable landing minima is 300 feet MDA/DH and one mile visibility or 4500 RVR / 1400 meters.

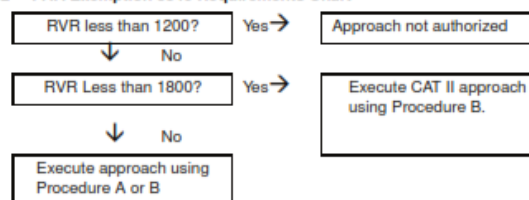
**C. FAA Exemption 5549**

The FAA recognizes the added safety associated with autopilot coupled approaches, auto landings, and HUD systems.

FAA Exemption 5549 provides relief from 14 CFR 121.652 to allow restricted Captains to conduct CAT I and CAT II approaches to published minima when using autopilot or HUD throughout the

approach (CAT I / II) and landing (CAT II). It is American Airlin requirements of the Exemption can be met in accordance with the following:

1. Restricted Captains may execute CAT I and CAT II ILS approaches to published DH and visibility minima at destination and alternate airports in accordance with the conditions and requirements shown in the FAA Exemption 5549 Requirements Chart on the next page.
2. FAA Exemption 5549 does not provide relief for restricted Captains to conduct non-ILS approaches to published minimums or to conduct CAT III ILS approaches.

**4.2.2 FAA Exemption 5549 Requirements Chart****Procedure A**

Execute approach using CAT I procedures to published CAT I DH. Autopilot coupler must be used to DH or missed approach. Following requirements must be met:

- Aircraft must be capable of coupled approach.
- Captain or F/O must have at least 75 hours in the aircraft in their respective crew position.
- Crosswind and tailwind limit is 10 knots.
- Headwind limit is 25 knots.
- Braking action must be reported as good or better.

**Procedure B**

Execute approach using CAT II procedures to published CAT II DH. Aircraft must be autolanded or flown with a HUD (737) to touchdown. Following requirements must be met:

- Runway must be approved for CAT II or III.
- Aircraft must be capable of auto landing or HUD must be operable (737).
- Captain or F/O must have at least 75 hours in the aircraft in their respective crew position.
- Crosswind and tailwind limit is 10 knots.
- Headwind limit is 25 knots.

**FO LESS THAN 100 HOURS IN TYPE:**FM1 4.2-4 / 3-15-11**4.2.3 First Officer With Less Than 100 Hours**

Reference: 14 CFR 121.438

A. If the second in command (SIC) has fewer than 100 hours of flight time as SIC in the type aircraft being flown, and the pilot in command (PIC) is not a qualified Check Airman, the PIC must make all takeoffs and landings in the following situations:

1. At all airports designated as PIC Special Qualification Airports.
2. The prevailing visibility in the latest WX report at the airport is at or below 3/4 mile.
3. The RVR for the runway to be used is at or below 4000 feet.
4. The runway to be used has water, snow, slush, or similar conditions which may adversely affect aircraft performance.
5. The braking action on the runway is reported less than good.
6. The crosswind component of the runway is in excess of 15K.
7. Windshear is reported in the vicinity of the airport.
8. Any other condition which the PIC determines it prudent.

## IOE BRIEFING & REFERENCES

### OPERATIONS & FLIGHT PLANNING:

#### OPERATIONS – CHECK EACH PILOT:

- License, English proficient on back
- Company ID current
- Medical current
- Passport, & visas (China, Russia, France as applicable)
- Current publications for the planned route (Captains – B777 specific US Domestic)

#### COMPUTER RESOURCES:

AAPilots/International Resources: Current Division Guides, Polar weather, ADS, Heavy, Polar briefings, Jepps Online Viewer, WSI SIGMETS, TURBULENCE reports and Kitbag/Online Manuals for Jepps as required.

Print:

1. Current Reference Guide for trip.....PRINT  
*Recommend: Use Ref Guide to ensure all required planning and in-flight checks are documented and complete*
2. WSI FL340 Chart.....PRINT
3. WSI Hi Lvl Sig Wx Chart or text as available .....PRINT
4. Other required documents iaw trip Reference Guide

#### FLIGHT PLAN ELECTRONIC SIGNATURE:

Captains sign the Flight Plan/Release by entering the JPY command in personnel mode, by sending an ACARS M22 message or by asking Dispatch to sign for the PIC.

FOS Electronic Signature Entry: **JPYFLT/DTE STA AGREE**

#### FLIGHT PLAN:

**FM1 Sec 17.4-1 / 3-15-11**

##### **17.4.1 Flight Plan Master Document**

The flight plan is the master document. Check that the route in the body of the flight plan agrees with the filed route message and the ICAO flight plan, if available.

Technique:

- Use the Reference Guide checklist to ensure that all preflight paperwork is collected, and properly prepared and crosschecked.
- Check the TD column to make certain that higher than normal temperatures aloft will not limit the aircraft from attaining the filed NAT crossing altitude.
- Outline or highlight the MC and SD columns.

#### TRR:

Maximum Terrain Height

*Flight Operations Technical Informational Bulletin*

August 1997 Number 97-04

*This bulletin for information only. Retain or destroy at your option.*

On September 2, 1997, flight plans will be modified to include terrain values in the body of the flight plan. TRR (Terrain) data will replace TRP column information.

**Terrain value information is the highest actual terrain height, 5 NM left and right of course between waypoints.**

TRR (Terrain) values within the body of the flight plan are informational only. It is intended to be used as a pre-flight and situational awareness tool, not as an altitude to fly.

In the flight *[edited]*, terrain is displayed in the TRR column.

**TRR is the highest terrain height between waypoints.**

**TRR is not a safe altitude to fly.**

Reference: 777 SA Division Guide

#### TRACK MESSAGE:

**FM1 17.5-4 / 3-15-11**

##### **17.5.6 North Atlantic Track Message Verification**

The flight plan coordinates must be compared against those listed on the track message. The date, time, and remarks of the track message should also be checked.

*Check: valid time and date vs. FI 30W estimate, remarks, TMI (track message identifier), contact frequencies for voice clearance, and compare the FP coordinates with the TM.*

#### FUEL PLANNING:

*Technique: Contact Ramp Control to check OUT to OFF times.*

*Take into account taxi time, airport and weather or SWAP delays, No Alternate Dispatch Fuel, Rerelease Fuel, ETOPS destination forecasts, and any other considerations and adjust fuel load with Dispatch if required prior to departure to preclude having to make fuel adjustments to accommodate MTO Fuel after gate departure. After Departure if approaching Min Takeoff Fuel, you will have to contact Dispatch to see if alternate, ETOPS or Rerelease fuel requirements can be safely adjusted to preclude returning to the gate and refueling.*

*The APU burns 600 PPH. The aircraft burns ~3600 PPH at idle. Use 4000 PPH for taxi fuel planning, engines only.*

**FM1 17.2-3 / 3-15-11**

##### **17.2.2 Fuel Block Format - Straight Release**

B. Explanation of Straight Release

1. PLAN ARR FUEL - Planned arrival fuel in pounds and endurance time (in hours and minutes HHMM).

2. ENRT BURN – Enroute fuel burn (OFF to ON) including one approach. This line also shows total time and ground distance in nautical miles.

3. E/RSV – FAR Enroute Reserve - fuel for 5% (5 PCT) of the triptime computed at cruise consumption rate. Exception: 10% (10 PCT) is used for straight releases without B343.

4. RSV – FAR International reserve is 30 minutes computed at 1500 feet MSL.

5. CA ADD – Add fuel requested by the Captain.

6. DISP ADD – This line is for contingency fuel and is adjusted by the Dispatcher. The reason for any DISP ADD fuel will be included in the remarks section of the flight plan. The amount of DISP ADD fuel that may be burned prior to takeoff, as designated by the Dispatcher, will be displayed as BUFR.

7. ALTN - Fuel, time and distance to the listed alternate(s). Takeoff fuel based on the most distant alternate. Alternate fuel includes a missed approach at destination, climb to the enroute altitude, long range cruise, descent, instrument approach and landing at the alternate.

8. HOLD – Fuel and time computed at planned landing weight and an altitude of 20,000 feet. It is specified by the dispatcher in minutes.

9. MEL/CDL – Fuel required by MEL/CDL items when appropriate.

10. T/O FUEL – Planned fuel for takeoff, excluding extra and ferry fuel. MIN T/O – Minimum fuel required at the start of takeoff

Minimum takeoff fuel does not include ballast fuel

11. TAXI - Identifies the departure station taxi burn.

12. TOTAL – A summation of all the previous elements.

13. RLS FUEL - Planned fuel onboard for gate departure.

14. ENDURNC – Approximate time in hours and minutes to stay aloft with the amount of fuel on board at brake release. ADJ 06.5 MINS/1000 LB – Adjustment to endurance for variation.

#### FUEL REQUIREMENTS:

**FM1 6.2-1 / 3-15-11**

##### **6.2.1 Pilot-Dispatcher Communications**

Reference: 14 CFR 121.601

The FARs make it clear that the Captain and Dispatcher are jointly responsible for all aspects of preflight planning, including fuel requirements. Their judgment and experience are indispensable elements in the preflight planning process. However, when the judgment and experience of the Captain and Dispatcher indicate a deviation from the fuel policy is necessary, it is vital both parties clearly agree and understand the reasons for the deviation and those reasons are clearly communicated.

#### ETOPS:

**FM1 17.3-1 / 3-15-11**

##### **17.3 EXTENDED OPERATIONS (ETOPS)**

Reference: 14 CFR 121.161, Appendix P; AC 120-42B; Ops Specs B342, B050, B055 and D086

### 17.3.1 ETOPS Authority

14 CFR 121.161 requires that a twin-engine aircraft must operate over a route that contains a point no more than one hour flying time (in still air at normal cruising speed with one engine inoperative) from an adequate airport unless it is operating under an approved ETOPS program. American Airlines has authority granted via Ops Specs B050, B342, and D086 to conduct ETOPS using 757, 767-200, 767-300, and 777 aircraft.

### 17.3.2 ETOPS Entry Point

The ETOPS entry point is the point on the outbound route which is one hour flying time at the approved one engine inoperative cruise speed (still air) from an adequate airport.

### 17.3.3 ETOPS 120 / 180 / 207 Minute Limitations

Reference: Ops Spec B342, 14 CFR 121.646(b) and 121.633

A. For the 757 and 767 the diversion time from any point along the route of flight must be no more than 180 minutes to a suitable enroute alternate at single engine inoperative (still air) cruise speed. The 180 minute limitation also applies to the 777, except on North Pacific routes.

B. On North Pacific routes, the 777 diversion time from any point along the route of flight may be extended to no more than 207 minutes provided certain other conditions are met. Refer to 207 Minute ETOPS on next page.

C. 14 CFR 121.633 "Considering Time-Limited Systems in Planning ETOPS Alternates." Various aircraft systems affect the capability of conducting ETOPS operations of certain durations. Some MEL items that permit flight on non-ETOPS routes can prevent ETOPS operations or limit ETOPS to 180 or 120 minutes. One example of a time-limited critical aircraft system is the cargo fire suppression system. The American Airlines computer flight planning system has the capability of taking MEL item time limitations into account in the flight planning process.

### 17.3.4 207 Minute ETOPS (777 Only)

Reference: Ops Spec B342, 14 CFR 121.633 & 121.633)

A. 207 minute ETOPS may be conducted only in the North Pacific area, only with 777 aircraft, and only on a flight-by-flight exception basis. The Dispatcher will first plan the flight at 180 minutes ETOPS, however if the Dispatcher determines that there are no suitable enroute alternate airports within this range, ETOPS may be extended to not more than 207 minutes provided the Dispatcher also verifies that there are adequate airports within 180 minute ETOPS range. Weather forecasts prior to departure for these adequate airports must provide the minima necessary to execute a normal instrument approach from the earliest planned arrival to the latest planned arrival time for the flight. There is no requirement for plus / minus one hour of ETA in this case.

B. To exercise this authority, the following conditions apply:

1. Special MEL requirements for operations in excess of 180 minutes.

2. Captain and Dispatcher must take into account the considerations which necessitate ETOPS in excess of 180 minutes and must agree that it is the appropriate action.

3. Dispatcher must ensure that, at all times, there is at least one suitable enroute ETOPS alternate airport within 207 minutes.

C. Prior to ETOPS entry point, Dispatcher will use datalink if necessary to revise flight plan due to re-evaluation of aircraft system capabilities and enroute alternates. Dispatcher will also review the enroute alternate airport forecasts and NOTAMS, and advise the flight crew of any change of suitable alternates within 207 minutes of the planned routing.

D. The Dispatcher shall record and document the information that substantiates the use of the 207 minutes dispatch for each flight where it is used. These records shall be maintained for at least three months and a copy shall be submitted to the FAA.

### 17.3.5 ETOPS Distances

The following are still air distances for 120 min., 180 min., and 207 min.

Equipment	S/E Speed	120 min.	180 min.	207 min.
777-200	.84 / 320 KIAS	865 nm	1295 nm	1490 nm

### ETP'S:

Dispatch requirement / Suitable vs. Adequate / Check weather  
Critical Fuel = Low alt 10M' + lcg (if fcst) + 5% + 15m hold + APU  
FM 17.5-2 / 3-15-11

### 17.5.3 Equal Time Point (ETP) Procedures

A. The ETP is the geographic point from which designated enroute alternate airports are equal in flight time.

B. Flight Plan ETPs are computer generated points that are identified by elapsed time after takeoff, and / or distance remaining to the destination. Estimated aircraft weight and fuel remaining at the ETP are examined by the computer to ensure that performance and fuel quantity (after dumping, if required) will be sufficient to divert to the named airport(s) in the most critical configuration of engine out and / or unpressurized flight.

C. ETPs are calculated and printed on the flight plan as a dispatch requirement to prove that the route of flight meets the regulatory requirements. In case of an event that requires landing at the nearest suitable airport, there may be other airports which in, the Captain's judgment, are suitable based on current weather, facilities, etc. and are closer than the ETOPS airports listed on the flight plan.

D. The location of the ETP(s) should be determined by elapsed time after takeoff, distance remaining to destination and / or the aircraft's Flight Management System (FMS) "Alternates," "Progress" and "Fix" pages.

E. Since the flight plan ETP presumes a worst case scenario, the flight times are based on winds at 15,000 feet. Winds may be different at cruise altitude, particularly in or near jet streams, which may cause the FMS computed ETP (based on winds at cruise altitude) to differ from the flight plan ETP (based on 15,000 feet winds). Consequently, in the event of a situation occurring near the flight plan ETP causing a diversion to an enroute alternate airport at cruise altitude, the Captain should use the Flight Management System (FMS) to determine the nearest appropriate airport.

F. If actual fuel is at or below planned fuel at ETP, a diversion is not required unless there is a condition which would preclude continued flight to destination. The ETP critical fuel is a flight planning function only and should not be used as the sole basis for a decision to divert to an alternate.

### ENROUTE ALTERNATES:

#### FMI 17.1-3 / 3-15-11

#### 17.1.6 Destination Alternate Weather Requirements

Destination alternate weather requirements for international operations, except ETOPS, are the same as destination alternate weather requirements for domestic operations. Refer to Destination Alternate Weather Requirements in Chapter 6 and ETOPS Suitable Enroute Alternates in the ETOPS section of this Chapter.

#### FMI 17.3-6

#### 17.3-12 ETOPS Suitable Enroute Alternates

Reference: 14 CFR 121.617, 121.623, 121.624, & 121.625; Ops Specs B055, B042, C055

A. ETOPS flights must have designated enroute alternate airports which are not more than 180 minutes from any point on the route of flight (except not more than 207 minutes from any point on the route for 207 minute 777 ETOPS). The forecast weather minimum requirements for the enroute alternates are the same as for destination alternates except that the suitable forecast weather minimums must exist from the earliest to the latest possible landing time.

B. Airports used as filed ETOPS alternates must be listed in AA Operations Specifications B042, B055 or C070. A list of authorized ETOPS alternates is available in Flight Manual Part II, Section 9.

C. The forecast weather minimum requirements for enroute alternates are the same as for destination alternates (refer to Destination Alternate Weather Requirements in chapter 6) except that for enroute alternates, the forecast weather minimums must exist from the earliest to the latest possible landing time.

D. Approximately one hour prior to the oceanic entry point, the Captain will review all potential enroute diversion airports along the route of flight using the most recent weather reports available.

E. In the event of a significant ATC reroute the Captain will contact dispatch to obtain a new flight plan, enroute alternates, and ETPs.

F. Weather and NOTAMs at the designated enroute alternate airports are monitored during flight by dispatch and significant adverse changes will be reported to the flight crew. Enroute alternate airports may be changed by agreement between the Dispatcher and Captain while enroute if necessary.

G. Before proceeding beyond the ETOPS entry point, if any conditions are identified at a filed alternate airport (such as weather forecast below landing minima) which would preclude a safe approach and landing, the Dispatcher and the Captain will designate another alternate airport.

H. If an actual emergency requires a landing at the nearest suitable airport, a different airport than the flight planned enroute alternate may be closer or more suitable and may be used for diversion after considering the airport facilities, NAVAIDs, weather conditions, NOTAMs, and nature of the emergency.

## FLIGHT PLAN CRITICAL FUEL BLOCK

### FMI 17.2-1 / 3-15-11

#### 17.2 FLIGHT PLAN FORMAT

The international flight plan format is the same as the domestic flight plan with a few exceptions. The international flight plan may have an ETP Block, a different Fuel Block, and asterisks (\*\*) in the body section denoting a re-release point or Class II navigation area associated with re-release or B-43 flight plans. The paragraphs that follow describe the unique international flight plan ETP and Fuel Blocks. General information concerning the header and body sections of flight plans is covered in the Computer Flight Plan Format in Chapter 6.

#### 17.2.1 Equal Time Point (ETP)

A flight plan equal time point (ETP) is a Dispatch-only function to determine Flight Plan ETOPS legality. Once airborne, Dispatch may adjust ETP airports based on changing weather conditions. The ETP blocks on the flight plan display distance, time, and fuel to an alternate airport.

A. Equal Time Point Format (Example shown, 767-300ER)

ETP / SUITABLE ENROUTE ALTERNATE DATA

B. Explanation of ETP Block numbers:

1. Indicates the route has been checked by the flight planning system and meets the extended range distance requirements to the enroute alternate airports.

(1) MEETS 180 MINUTE AREA OF OPERATIONS RULE

(2) \*\*\* CEPAC FULL ICE 180 MIN/290 KIAS \*\*\*

(3) ETP FOR KSFO / PHNL 1082 NM TIME 0623

(4) ETP / FOB 045816 CRITICAL FUBO 039795

(5) ENG OUT TIME FRM ETP 0231 DESC M078/290K CRUZ 290K FLVL 243

(6) TO SFO N37371 W122224 1065 NM TH 070 MH 055 TD  
P01 WCP P05  
TO HNL N21191 W 157552 1051 NM TH 230 MH 218 TD  
P08 WCP P02

2. Indicates the basis for the critical fuel calculation for geographic area, icing considerations, ETOPS time limit, and diversion speed. For the example shown, it indicates:

CEPAC This data is valid for Central Pacific operations. If this information is omitted, the data is not limited to any geographic region. The acronym CEP is also used.

FULL ICE Critical fuel burn is based on diverting in icing conditions.

NO ICE Icing conditions not forecast

180 MIN 180 minute rules were applied.

290 KIAS Is the ETOPS diversion speed used for this flight. For 757 /767 operations, the Dispatcher may select between 290 and 320 knot diversion speeds.

3. Identifies designated suitable airports on which the ETP computations are based. The distance is from ETP to the original destination airport. The time is from the departure airport to the ETP in hours and minutes.

4. Planned fuel on board at the ETP is 45816; critical fuel required is 39795 from the ETP point to either of the named alternates.

These amounts account for dispatch requirements outlined in 14 CFR 121.646 (b) for a critical fuel burn scenario assuming:

- Simultaneous rapid decompression and engine failure at ETP, followed by descent to 10,000 feet and cruise at engine out airspeed.
- Fuel to account for errors in wind forecasting.
- Fuel to account for forecast icing.
- Fuel to account for engine performance deterioration between overhauls.
- Fuel to account for hold at 1500 feet for 15 minutes plus approach and landing.
- Fuel to account for inflight APU. (The FOS computer flight planning system ensures that there is sufficient fuel for continuous APU use during diversions.)

5. Performance information from the ETP to either of the named suitable airports. Time is shown from the ETP to either airport. DESC is the descent speed shown as .78 MACH until the cross-over to 290 KIAS. The initial driftdown cruise altitude for the planned weight is FL243.

6. Navigational data from the ETP to the named airports (SFO and HNL in this example), LAT/LONG for the airports, distance from the ETP, true and magnetic headings, temperature deviation from standard, and the wind component based on an altitude of 15,000 feet. 17.2.2 Fuel Block Format - Straight Release

A. Sample

B.

(1)	PLAN	ARR	FUE	018881	0200						
-----											
			ARPT	FUEL	TIME	DIST					
(2)	ENRT	BRN	CDG	081899	0727	3722					
-----											
(3)	E/RSV		5 PCT	03487	0022						
(4)	RSV			04223	0030						
(5)	CA ADD			00000	0000						
(6)	DISP ADD			02000	0014		BUFR		01000		
(7)	1ST ALTN	LGW		*06198	*0033	0173	FL300				
	2ND ALTN	ORY		*02546	0013	0035	FL060				
(8)	HOLD			02973	0021		BUFR		00708		
(9)	MEL/CDL			00000							
-----											
(10)	T/O FUEL			100780					MIN T/O	099072	
-----											
(11)	TAXI ORD			00960	0024						
-----											
(12)	TOTAL			101740							
(13)	RLS FUEL CDG			101740							
(14)	ENDURNC	1104	ADJ 06.5	MINS / 1000	LB						

B. Explanation of Straight Release

1. PLAN ARR FUEL - Planned arrival fuel in pounds and endurance time (in hours and minutes HHMM).
2. ENRT BURN - Enroute fuel burn (OFF to ON) including one approach. This line also shows total time and ground distance in nautical miles.
3. E/RSV - FAR Enroute Reserve - fuel for 5% (5 PCT) of the trip time computed at cruise consumption rate. Exception: 10% (10 PCT) is used for straight releases without B343.
4. RSV - FAR International reserve is 30 minutes computed at 1500 feet MSL.
5. CA ADD - Add fuel requested by the Captain.
6. DISP ADD - This line is for contingency fuel and is adjusted by the Dispatcher. The reason for any DISP ADD fuel will be included in the remarks section of the flight plan. The amount of DISP ADD fuel that may be burned prior to takeoff, as designated by the Dispatcher, will be displayed as BUFR.
7. ALTN - Fuel, time and distance to the listed alternate(s). Takeoff fuel based on the most distant alternate. Alternate fuel includes a missed approach at destination, climb to the enroute altitude, long range cruise, descent, instrument approach and landing at the alternate.
8. HOLD - Fuel and time computed at planned landing weight and an altitude of 20,000 feet. It is specified by the dispatcher in minutes.
9. MEL/CDL - Fuel required by MEL/CDL items when appropriate.
10. T/O FUEL - Planned fuel for takeoff, excluding extra and ferry fuel. MIN T/O - Minimum fuel required at the start of takeoff.

Minimum takeoff fuel does not include ballast fuel

11. TAXI - Identifies the departure station taxi burn.

12. TOTAL – A summation of all the previous elements.

13. RLS FUEL - Planned fuel onboard for gate departure.

14. ENDURNC – Approximate time in hours and minutes to stay aloft with the amount of fuel on board at brake release. ADJ 06.5 MINS/1000 LB – Adjustment to endurance for variation.

### FMI 17.1-9 / 3-15-11

#### G. ETP Fuel

1. If additional fuel is required to meet ETP requirements, the additional fuel will be shown as "ADD" fuel on the flight plan, and the Dispatcher must note the reason with a remark.

2. Fuel added solely to increase the ETP fuel should not exceed 1000 lbs.

3. ETP critical fuel planning factors are derived from 14 CFR 121.646(b). In addition to all other normal wind and weather enroute planning factors there must be enough fuel on board to account for the following:

a) Fly to an ETOPS alternate airport under whichever of the potentially adverse conditions occurring at the most critical point (ETP) in the following subparagraphs that result in the greatest requirement for additional fuel over normal planning factors.

- Assuming a simultaneous rapid decompression and an engine shutdown, have sufficient fuel to descend to and fly at a safe altitude in compliance with the oxygen supply requirements of 14 CFR 121.333 at the recommended one engine inoperative speed for that altitude. This is normally the most demanding scenario.

- Assuming an engine failure, have sufficient fuel to descend to the one engine inoperative cruise altitude and fly at the recommended one engine inoperative cruise speed and altitude.

- Assuming a rapid decompression have sufficient fuel to descend to and fly at a safe altitude in compliance with the oxygen supply requirements of 14 CFR 121.333.

- Plan sufficient fuel to account for errors in wind forecasting for the above situations. In calculating the amount of fuel required for a rapid decompression and engine shutdown, the certificate holder must adjust the actual forecast wind speed by 5% (resulting in an increase in headwind or a decrease in tailwind) to account for any potential errors in wind forecasting.

- For the above adverse situations, plan the greater amount of either fuel to account use of wing / engine anti-ice systems for the entire time icing is forecast or fuel to account for increased fuel consumption due to degraded airframe performance for 10% of the time icing is forecast.

- For the above situations, fuel to account for engine deterioration. In calculating the amount of fuel required for engine failure and rapid decompression, (after completing the wind calculation) the

airplane must also carry fuel equal to 5% of the fuel specified above, to account for deterioration in cruise fuel burn performance unless the certificate holder has a program to monitor airplane in-service deterioration to cruise fuel burn performance.

b) Fuel to account for holding, approach, and landing. In addition to the fuel required to fly to an ETOPS alternate, the airplane must carry fuel sufficient to hold at 1500 feet above field elevation for 15 minutes upon reaching that Alternate Airport and then conduct an instrument approach and land.

c) Fuel to account for APU use. If an APU is a required power source, the certificate holder must account for its fuel consumption during the appropriate phases of flight.

### INTERNATIONAL PLANNING:

#### INTERNATIONAL FUEL POLICY

##### FMI 17.1-7

##### 17.1.12 International Fuel Policy

It is AA company policy to dispatch with only the minimum quantity of fuel required considering safety, regulations, customer service, schedule reliability, and operating economics.

#### A. Destination Alternate Airport

1. Dispatch without a destination alternate airport, unless required.

2. If a destination alternate airport is required, the alternate airport should be the nearest authorized alternate airport that meets:

- Weather requirements
- Operational requirements
- Appropriate and adequate services are available.

3. A destination alternate is not required for a re-release if the flying time from the re-release point to the destination is less than 6 hours, and the destination airport meets the prescribed weather conditions.

#### B. Fuel Reserves

1. Fuel planning will be optimized by using the preferred type of release method that is listed in the **Preferred Dispatch Fuel Policy Table**.

2. If Dispatch determines that using the release type specified in the **Preferred Dispatch Fuel Policy Table** (Which follows in this Chapter) is not available or practical, due to weather, operational requirements or operating economics, an alternative type of release that will minimize the amount of fuel reserve should be used.

### ALTERNATE WEATHER:

*Technique: Check FP for both destination and enroute alternate weather and forecasts. You must determine the forecast weather for the estimated time of arrival in case of a diversion. Use the FI plus the time enroute and check the enroute forecasts for planned alternates. Once enroute update and monitor actual/forecast*

*alternate airport weather. Call Dispatch for assistance in selecting an appropriate diversion airport for a medical, mechanical or emergency landing as necessary. To print current and forecast weather: SLG\*ATLANTIC/SA and SLG\*ATLANTIC/TAF (also EUROPE, ALASKA, PACI, SCANDI, RUSSIA, ASIA, CARIB, CENAMR, SAMR).*

### FMI 6.3-3 / 3-15-11

#### 6.3.4 Destination Alternate Weather Minimums

Reference: Ops Spec C055)

#### A. Alternate Airport IFR Weather Minimums

Approach Facility Configuration	Ceiling	Visibility
For airports with at least one operational navigational facility providing a straight-in non-precision approach, or Category I precision approach, or when applicable, a circling maneuver from an Instrument Approach Procedure.	Add 400 feet to the MDA(H) or DA(H), as applicable.	Add 1 statute mile or 1600 meters to the landing minimum.
For airports with at least two operational navigational facilities, each providing a straight-in approach procedure to different suitable runways. (May be reciprocal direction approaches to the same runway)	Add 200 feet to the higher MDA(H) or DA(H) of the two approaches used	Add ½ statute mile or 800 meters to the higher landing minimum of the two approaches used.
<b>B737 or B777</b> (Only applies to aircraft capable of single engine CAT III ILS approaches.) At least one useable Category II ILS.	300 feet	¾ statute mile or 1200 meters visibility or RVR 4000 feet (1200 meters).
<b>B737 or B777</b> (Only applies to aircraft capable of single engine CAT III ILS approaches.) At least one useable Category III ILS.	200 feet	½ statute mile, domestic visibility or 700 meters international visibility, or RVR 1800 feet (550 meters).

#### **NOTE**

Additives are applied only to the height value (H) to determine the required ceiling.

B. In determining alternate airport weather minimums, it is not permissible to use minimums for any published instrument appch which specifies that alternate airport weather minimums are not authorized.

C. Alternate airport weather minimums may not be based on the availability of RNAV/GPS or RNAV/(RNP) approaches (Ref: AC 120-130A).

D. Additives are applied only to the height value (H) to determine the required ceiling.

E. When determining the suitability of a runway, wind (including gust) must be forecast to be within operating limits, including reduced visibility limits, and should be within the manufacturer's maximum demonstrated crosswind. (Refer to Landing Wind Limits in Chapter 10).

F. When dispatching under the provisions of the MEL, those MEL limitations affecting instrument approach minima must be considered in determining alternate airport minima.

G. Unmonitored Navigation Aids or Approach Lights

1. A NOTAM indicating that a NAVAID is unmonitored means that the NAVAID is not monitored by the tower for proper operation.

This does not alter basic minimums for a destination airport, however, filing the airport as a destination alternate is not permitted if alternate minimums must be based on the unmonitored NAVAID.

2. A NOTAM indicating that an approach lighting system is unmonitored does not change published minimums for appchs to the runway involved. Airports with unmonitored approach lights should not be listed as a destination alternate if the alternate minimums are based on an approach using that lighting system.

H. All conditional forecast elements below the lowest applicable operating minima must be taken into account and the provisions of Exemption 3585 applied, if required (refer to next paragraph, Alternate Exemption for Weather Forecast Remarks).

#### ETOPS ALTERNATES:

##### FMI 17.3.6 / 3-15-11

##### 17.3.12 ETOPS Suitable Enroute Alternates

Reference: 14 CFR 121.617, 121.623, 121.624, & 121.625; Ops Specs B055, B042, C055

A. ETOPS flights must have designated enroute alternate airports which are not more than 180 minutes from any point on the route of flight (except not more than 207 minutes from any point on the route for 207 minute 777 ETOPS). The forecast weather minimum requirements for the enroute alternates are the same as for destination alternates except that the suitable forecast weather minimums must exist from the earliest to the latest possible landing time.

B. Airports used as filed ETOPS alternates must be listed in AA Operations Specifications B042, B055 or C070.

A list of authorized ETOPS alternates is available in Flight Manual Part II, Section 9.

C. The forecast weather minimum requirements for enroute alternates are the same as for destination alternates (refer to Destination Alternate Weather Requirements in chapter 6) except that for enroute alternates, the forecast weather minimums must exist from the earliest to the latest possible landing time.

D. Approximately one hour prior to the oceanic entry point, the Captain will review all potential enroute diversion airports along the route of flight using the most recent weather reports available.

E. In the event of a significant ATC reroute the Captain will contact dispatch to obtain a new flight plan, enroute alternates, and ETPs.

F. Weather and NOTAMs at the designated enroute alternate airports are monitored during flight by dispatch and significant adverse changes will be reported to the flight crew. Enroute

alternate airports may be changed by agreement between the Dispatcher and Captain while enroute if necessary.

G. Before proceeding beyond the ETOPS entry point, if any conditions are identified at a filed alternate airport (such as weather forecast below landing minima) which would preclude a safe approach and landing, the Dispatcher and the Captain will designate another alternate airport.

H. If an actual emergency requires a landing at the nearest suitable airport, a different airport than the flight planned enroute alternate may be closer or more suitable and may be used for diversion after considering the airport facilities, NAVAIDs, weather conditions, NOTAMs, and nature of the emergency.

#### RELEASE & RERELEASE PLANNING:

##### 17.1.11 International Fuel Requirements - Dispatch and Takeoff

Reference: 14 CFR 121.645, 121.647, Ops Specs B043, B044, B343

A. AA aircraft may be dispatched and released for international operations under one of five authorizations:

- 14 CFR 121.645 Straight Release
- Ops Spec B043 Special Reserves Release
- Ops Spec B044 Planned Re-release
- 14 CFR 121.645 Straight Release in conjunction with Ops Spec B343 (5%)
- Ops Spec B043 Special Reserve Release in conjunction with Ops Spec B343 (5%)

1. **Straight Release** (14 CFR 121.645) provides that the flight will have enough fuel to fly to and land at the airport to which it is released, plus sufficient fuel for the following:

- a) Enroute Reserve: To fly for a period of 10% of the total time required to fly from the departure airport and land at the airport to which it was released.
- b) Alternate Fuel: To fly to and land at the most distant alternate airport specified in the flight release (if an alternate is required).
- c) Reserve Fuel: To fly for 30 minutes at holding speed at 1500 feet above the destination alternate airport (or the destination airport if no alternate is required) at standard temperature conditions.
- d) Alternate "NONE" may be planned if the flight is six hours or less and weather at destination does not require an alternate.

2. **B043 Special Reserves** (Ops Spec B043) provides that the flight will have enough fuel to fly to and land at the airport to which it is released, plus sufficient fuel for the following:

- a) Enroute Reserve: To fly for a period of 10% of the enroute time during which the aircraft's position cannot be reliably fixed at least once each hour using ICAO Class I navigation facilities.
- b) Alternate Fuel: To fly to and land at the most distant alternate airport specified in the flight release (if an alternate is required).
- c) Reserve Fuel: To fly for 45 minutes at normal cruise altitude
- d) Additional requirements:
  - The forecast for the destination and alternate airports must be at or above applicable minimums at ETA.
  - A second alternate airport will be required if destination and alternate airports are marginal.

e) Alternate "NONE" may be planned if the flight is six hours or less and weather at destination does not require an alternate.

3. **B044 Planned Re-release** (Ops Spec B044) is a method of reducing the reserve fuel requirements by initially releasing the flight to an intermediate (re-release) airport, with the intention of re-releasing the flight to the final destination from an enroute point.

This method involves multiple releases, with each release following the requirements of 14 CFR 121.645 as described above under Straight Release. The reduced reserve fuel is achieved because the final release to the destination is based on the flying time from the re-release point to the final destination.

4. **Straight Release in Conjunction with Ops Spec B343 (5%)** uses a deviation from 14 CFR 121.645 granted by the FAA to American Airlines. The deviation allows AA to reduce the enroute reserve fuel (shown as E/RSV on an AA flight plan) from 10% to 5% on a straight release.

Except for the reduction in enroute reserve fuel, all other requirements for a Straight Release must be met, plus the following:

- a) At the time the flight is dispatched or released, appropriate weather reports or forecasts or any combination thereof must indicate that the weather conditions at the destination will be at or above the authorized IFR approach and landing minimums at the estimated time of arrival.
- b) At the time the flight is dispatched or released, all flight deck fuel quantity indicators must be operational (MEL requirement).
- c) Flight crew must report position, route, altitude, and fuel at regular intervals not to exceed 90 minutes.
- d) Both a primary and secondary method of communicating the reports must be available for the entire route of flight (MEL requirement).
- e) Cannot be used in conjunction with a B044 Planned Re-release.

5. **B043 Special Reserves in conjunction with Ops Spec B-343 (5%)** uses a deviation from 14 CFR 121.645 granted by the FAA to American Airlines. The deviation allows AA to reduce the enroute reserve fuel (shown as E/RSV on an AA flight plan) from 10% to 5% on a release using B043 Special Reserves.

Except for the reduction in enroute reserve fuel, all other requirements for Special Reserves (B43) must be met, plus the following:

- At the time the flight is dispatched or released, appropriate weather reports or forecasts or any combination thereof must indicate that the weather conditions at the destination will be at or above the authorized IFR approach and landing minimums at the estimated time of arrival.
- At the time the flight is dispatched or released, all flight deck fuel quantity indicators must be operational (MEL requirement).
- Flight crew must report position, route, altitude, and fuel at regular intervals not to exceed 90 minutes.
- Both a primary and secondary method of communicating the reports must be available for the entire route of flight (MEL requirement).

#### NOTE

If the entire route is planned in ICAO Class I airspace, the flight is not released with Special Reserves in conjunction with Ops Spec B343.

- Reserve fuel for flights between U.S. airports and Canadian / Mexico airports that do not have extended overwater segments will be in accordance with Domestic rules.
- Reserve fuel for intra-Canada or intra-Mexico flights will be in accordance with International rules.
- The Flight Plan Fuel Block format indicates the type of release used.
  - Straight Release has one column; the Enroute Reserve is shown as E/RSV. The destination Reserve (RSV) is always 30 minutes computed at 1500 feet MSL.
  - B043 Special Reserves release has one column; the Enroute Reserve is shown as SP/RSV and the words ""B43 SPECIAL RESERVES USED"" will appear after the Enroute Reserve fuel value. Destination Reserve (RSV) is always 45 minutes computed at normal cruise.
  - B044 Planned Re-release has two columns; the Enroute Reserve is shown as E/RSV. Destination Reserve (RSV) is always 30 minutes computed at 1500 feet MSL.

#### 17.1.12 International Fuel Policy

It is AA company policy to dispatch with only the minimum quantity of fuel required considering safety, regulations, customer service, schedule reliability, and operating economics.

##### A. Destination Alternate Airport

- Dispatch without a destination alternate airport, unless required.
- If a destination alternate airport is required, the alternate airport should be the nearest authorized alternate airport that meets:
  - Weather requirements
  - Operational requirements
  - Appropriate and adequate services are available.
- A destination alternate is not required for a re-release if the flying time from the re-release point to the destination is less than 6 hours, and the destination airport meets the prescribed weather conditions.

##### B. Fuel Reserves

- Fuel planning will be optimized by using the preferred type of release method that is listed in the **Preferred Dispatch Fuel Policy Table**.
- If Dispatch determines that using the release type specified in the **Preferred Dispatch Fuel Policy Table** (Which follows in this Chapter) is not available or practical, due to weather, operational requirements or operating economics, an alternative type of release that will minimize the amount of fuel reserve should be used.

#### 3. Preferred Dispatch Fuel Policy Table

Area of Operation	Departure	Destination	Release Type
North Atlantic	Eastern Continental US	Bermuda	Straight (5%)
	Central and Western Continental US	Europe	Straight (5%)
	Bermuda	Europe	B-43
	Eastern Continental US	Eastern Continental US	Straight (5%)
	Europe	Eastern Continental US excluding RDU and MIA	Straight (5%)
Eurasia	Central, Western Continental US, RDU, and MIA	Central, Western Continental US, RDU, and MIA	B-44 (Re-Release)
	Continental US	Moscow and India	B-43
Pacific	Moscow and India	Continental US	B-44 (Re-Release)
	Continental US	Japan and China	B-44 (Re-Release)*
	Japan and China	Central and Eastern Continental US	B-44 (Re-Release)
	Western Continental US	Western Continental US	Straight (5%)
Hawaii	Continental US	Hawaii	Straight (5%)
	Hawaii	Central and Eastern Continental US	B-44 (Re-Release)
	Western Continental US	Western Continental US	Straight (5%)
Alaska	Continental US	Alaska	B-43
	Alaska	Continental US	B-43
Caribbean & Central America	Continental US	Caribbean and Central America	Straight (5%) or B-43**
	Caribbean and Central America	Continental US	Straight (5%) or B-43**
South America	Continental US	South America	Straight (5%) or B-43**
	South America	Continental US	Straight (5%) or B43**
	Intra-South America		B-43

#### Notes

Straight Release with 10% E-RSRV is used only when weather conditions preclude use of straight release with 5% E-RSRV or B-43 (with 5% E-RSRV), and when B-44 is deemed unworkable.

Eastern Continental US includes the following airports: BDL, BOS, BWI, EWR, FLL, IAD, JFK, MIA, MCO, PHL, RDU and TPA

Central Continental US includes the following airports: DFW, ORD and STL

Western Continental US includes the following airports: LAX, SEA, SJC and SFO

\* Flights to Japan and China with a route south of the NOPAC routes should use a straight release.

\*\* **DISPATCHER NOTE:** For flights to / from Caribbean, Central, and South America, defaults may be seen for both straight and B-43 releases depending on stage lengths.

#### DESTINATION ALTERNATE:

FMI 17.1-2 / 3-15-11

#### 17.1.5 Conditions Requiring a Destination Alternate - International

Reference: 14 CFR 121.621

A. A destination alternate is required when:

- Flight time exceeds 6 hours, or,
- Flight time is 6 hours or less and the destination weather (+/- 1 hour of ETA) and appropriate weather reports and forecasts or any combination thereof are less than:
  - Ceiling of 2000 feet above airport elevation or 1500 feet above the lowest published minimum (whichever is greater), or, if a circling approach is required at the destination airport,

a ceiling of less than 1500 feet above the lowest circling MDA will require an alternate, or,

b) Visibility is 3 miles, or 2 miles more than the lowest applicable minimums (whichever is greater), for the instrument procedures to be used at the destination airport.

B. Prudent judgment dictates an alternate airport be identified whenever the forecast crosswind component exceeds the "wind limits" set forth in Chapter 10 or runways are forecast to be icy or contaminated.

C. An alternate airport is always required for flights to Bermuda (BDA/ TXKF).

#### 17.1.6 Destination Alternate Weather Requirements

Destination alternate weather requirements for international operations, except ETOPS, are the same as destination alternate weather requirements for domestic operations. Refer to Destination Alternate Weather Requirements in Chapter 6 and ETOPS Suitable Enroute Alternates in the ETOPS section of this Chapter.

### **NO DESTINATION ALTERNATE:**

#### **FMI 6.3-5 / 3-15-11**

#### **6.3.6 Alternate Airport Exemption for Domestic CAT I ILS Approach**

Reference: FAA Exemption 10,000; Ops Spec A005, A012, C355, Under FAA Exemption 10,000 to 14 CFR 121.619, Amercian Airlines is allowed to dispatch / release flights without an alternate airport provided:

A. If for at least one hour before and one hour after the estimated time of arrival at the destination airport the appropriate weather reports or forecasts, or any combination of them, indicate:

- The ceiling will be at least 1000 feet above the airport elevation; And
- Visibility will be at least 3 miles.

B. The flight is to a domestic destination within the 48 contiguous United States and the District of Columbia from a departure airport in those same domestic locations or from any of the following airports:

1. Mexico: Acapulco, Guadalajara, Ixtapa-Zihuatanejo, Leon, Monteray, Puerto Vallarta, or San Jose DelCabo.
2. Canada: Calgary, Montreal, Ottawa, Toronto or Vancouver.
3. Other airports: Anchorage, AK; Freeport or Nassau, Bahamas.

C. The intended destination airport and runway(s) of intended landing must have at least one operational CAT I approach with minimums of RVR 2000 / HAT 200 feet or lower. Dispatchers are provided with a current list of domestic airports that meet these approach requirements.

D. The aircraft and flight crew must be qualified to fly any CAT I approach.

E. Thunderstorms are not forecast in either the main body of a weather report or in the remarks section of the forecast, or reported between one hour before to one hour after the estimated time of arrival at the destination airport.

F. The dispatcher and flight crew must communicate any delays; changes to the planned route, altitude, airspeed; enroute holding, unplanned use of anti-icing; or other factors that may have a negative effect on trip fuel.

G. The dispatcher must have a system to display and update the location of the flight and other aircraft, including those of other operators; filed and actual ATC routing; and an overlay of the current, significant weather. The system must automatically alert the dispatcher to a change in forecast or a special weather update.

H. In the event the monitoring or capability requirements listed above become inoperative after dispatch, the pilot in command and dispatcher will determine whether the flight can be continued safely.

I. Use of an alternate exemption will be notated on the release in the fuel block as follows:

PLAN	ARR	FUEL	015317	0302
-----				
	ARPT	FUEL	TIME	DIST
ENRT	BRN	AUS	022748	0318 1309
-----				
RSV		04250	0045	
ALTN		00000	0000	0000
HOLD		02671	0031	
-----				
T/O FUEL011361MIN T/0010930				

#### **6.3.7 Departure from an Alternate Airport**

##### **Reference: 14 CFR 121.637**

A. No flight will takeoff from an alternate airport or from an airport not listed in the Ops Specs unless:

1. Such airport and related facilities are adequate for the operation of the aircraft.
2. The flight is dispatched in accordance with all dispatching rules applicable to operations from an approved airport.

### **EXTERIOR PREFLIGHT:**

#### **ICING:**

<5°C – Note: @ LHR check for frost after refueling. You will find both occasional wing frost after refueling and fuselage frost in the mornings. The aircraft are sometimes pre-deiced. Check at LHR Ops or call 131.92.

#### **Pre-Flight Procedures**

##### **OM1 General 20.5 / 12-1-10**

Walk-Around Inspection During exterior pre-flight, carefully inspect areas where surface snow, ice or frost could change or affect normal system operations.

### **NOTES**

- Advise Dispatch if contaminated runway adjustments are necessary for snow, slush, ice or standing water.
- It is very difficult to distinguish between deicing / anti-icing fluids and hydraulic fluid. In small quantities and thin coatings, both fluids will have similar coloring and feel slippery to the touch. During the exterior inspection, if residual fluids on aircraft surfaces cannot be identified, contact local Maintenance or call MOC for guidance.

Do the normal Exterior Inspection with the following additional steps:

Surfaces ..... Check  
Takeoff with light coatings of frost, up to 1/8 inch (3mm) in thickness, on lower wing surfaces due to cold fuel is allowable; however, all leading edge devices, all control surfaces, and upper wing surfaces must be free of snow, ice and frost.

Thin hoarfrost is acceptable on the upper surface of the fuselage provided all vents and ports are clear. Thin hoarfrost is a uniform white deposit of fine crystalline texture, which usually occurs on exposed surfaces on a cold and cloudless night, and which is thin enough to distinguish surface features underneath, such as paint lines, markings or lettering.

### **EXTERIOR LIGHTS:**

#### **OM1 Pre-Flight 10.7 / 10-25-1010**

Exterior Lighting ..... SET

- Beacon Light Switch – OFF
- Navigation Light Switch – ON
- Wing Light Switch – Off
- Runway Turnoff Light Switches – OFF
- Taxi Light Switch – OFF
- Strobe Light Switch – OFF
- Indicator Lights Switch – Test

*The last mechanic I spoke with said cycling lights for checks wears them out faster than leaving them off.*

### **GEAR PINS:**

*Location: Gear pins are stored in a dark plastic box forward of the E&E compartment walkway on the left hand top side of the right forward equipment rack just above the ship's battery (at floor level). NOTE: See page 13 for diagram.*

#### **OM1 Pre-Flight 15.2 / 11-1-07**

If a gear pin(s) is found installed, station personnel (maintenance and / or agent) must be notified that a pin(s) needs to be removed before departure. Prior to departing the gate, a crewmember will visually check the gear to confirm that the pin(s) has been removed. If the pin(s) belong to the airplane, it should be returned to the airplane. The gear pins are stowed in the E&E compartment.

NOTE: Crewmembers will not remove gear pins. Removal of gear pins prior to the airplane's departure is the sole responsibility of the station.

### DRAIN MAST WATER LEAKS:

*During exterior preflight if a steady stream of water is observed running from any of the drain masts, contact maintenance.*  
Email / 3-4-09

This is a well documented problem on the MAK2000 and the coffee manufacture B.E. Aerospace is well aware of this problem for the 20 + years we have had this product on our A/C. We call it the catastrophic water leak. Most of the times it occurs is when the vent valve does not seat properly. (The vent valve allows the water tank to drain when the potable water system is unpressurized and the tank to fill when the water system is pressurized. It is a float style ball that seals on a rubber seal with the water pressure.) There are many reasons for the float does not to seal. It is well documented that reseating the coffee maker will, in most cases, correct the issue.

Ken Herold did a study back is 2002(attached) and documented most of the leak conditions and the costs associated with the purposed solutions. There is no ROI and no Product Team wanted to budget for a program that wasn't a permanent fix at that time.

We are currently going to run a test on the 767-200 fleet with the BE Endura coffee maker vent valve in the first half of this year. The test will change all 120 coffee makers on the fleet and the coffee maker shop will record the time interval until the coffee makers return to the shop. The short comings of this test is that the new vent valve is to help in catastrophic water leak, but the coffee maker will most likely be pulled due to a perceived leak, as sump drains are not properly clean and build up residual water from the 4-8 oz of water that is released normally by the coffee maker when started with a tank of cold water. This residual water, during takeoff and landings, splashes out and the coffee maker is written up for a perceived leak. This is well documented also.

In addition to this, there is a team assembled that is looking at new coffee makers, as the current coffee makers are not offered for new sales any more or for the MAK7000 coffee maker, the cost of the coffee maker has been Increase due to B.E. Aerospace buying CSI and wanting to sell their Endura model to the airlines. The Team is well aware of the leaking issue associated with the current coffee makers. No information on when a decision will be made or if there is a ROI to replace the existing inventory of current coffee makers.

Jim Dees  
B777 Fleet Captain

### OPEN NEGATIVE PRESSURE VENT:

OM1 Preflight 15.3 / 3-2-09

*[Items omitted for clarity]*

Right Forward Fuselage

- Negative pressure relief vents flush (2)

Email / 3-4-09

The valve is spring loaded [per AMM Part I], and cabin pressure seats the door into the fully closed position. When the aircraft is unpressurized, the valve needs approximately 14 pounds of force to overcome the spring and open up [per AMM Part II]. When the aircraft is not pressurized, it is very conceivable that the wind could exert 14 pounds of force and open the door part way. I don't consider this a problem.

Brad Pearson, Specialist Engineer

767/777 Airframe and Systems Engineering

### STATIC DISCHARGERS:

*Wing: 10 trailing edge / 3 wingtips*

*Stab and Rudder: 6 trailing edges / 2 tips*

CDL 23-1 / 2-01-10

A maximum of 5 static dischargers may be missing with the following exceptions:

- a) Two of the five most outboard dischargers must not be missing from each wingtip.
- b) Two of the four most outboard dischargers must not be missing from each horizontal stabilizer tip.
- c) Two of the four most top dischargers must not be missing from the vertical stabilizer tip.

### INTERIOR PREFLIGHT:

#### PRE-FLIGHT INSPECTION:

OM1 Pre-Flight 10.1 / 11-1-08

Preface

The entire Pre-Flight Inspection is accomplished prior to every flight. When maintenance has been performed, the pre-flight item(s) associated with the system, component, etc., should be checked. Also check that any associated c-b's that may have been pulled have been reset.

The Pre-Flight Inspection may be accomplished by one pilot individually, or it may be split between the pilots.

#### DUAL POWER SOURCES:

Technique: If external Primary/Secondary power will not stay connected and connects/disconnects due to gate power fluctuations, try connecting Primary only with the APU, if available.

OM1 Pre-flight 10.1 / 11-1-08

Electrical Power Up Procedure

Battery  
Switch .....ON  
C1 and C2 Primary Pump Switches.....OFF  
Demand Pump Selectors .....OFF  
Wiper Selectors.....OFF  
Landing Gear Lever .....DN  
Alternate Flaps Panel .....SET  
• Alternate Flaps Arm Switch – OFF  
• Alternate Flaps Selector – OFF  
Electrical Power .....ESTABLISH  
Bus Tie Switches – AUTO  
☐ If external power is desired:  
Primary External Power AVAIL Light – Illuminated  
Primary External Power Switch – Press  
☐ If the Secondary External Power AVAIL Light is illuminated:  
Secondary External Power Switch – Press  
☐ If APU power is desired:  
APU Generator Switch – ON  
APU Selector – START, then ON  
While at the gate, the use of two sources of electrical power is recommended to reduce the potential heat build-up on the contactors and electrical panel.  
This recommendation can be met with the following configurations:  
• PRIMARY and SECONDARY External Power (most cost-efficient configuration but may not be available at all airports)  
– Sufficient PCA cooling must be connected.  
• PRIMARY External Power and APU Power  
– The APU shares electrics with external power and provides cooling.

*Email 11-24-09 from Bruce Moore, B777 GS Instructor*  
*We have occasional problems connecting external electrical when both Primary and Secondary Power are Available and selected, because the aircraft will reject all external power when the total voltage is less than 180 KVA (Note - DFW had 140 KVA via both plugs combined, and we couldn't establish external power until we removed one ground power plug and then selected only one external power source). "Removed" may be the wrong term. It was when we tried to select both power sources that we had the problem. When selecting only one external power source with one plug only, there was no problem because 90 total KVA was then available, versus only 70 from each individual plug when both external sources were selected. Our computer airplane keeps a lot of secrets.*

CABIN FAMILIARIZATION:

1L F/A Control Panel – Lav pre-charge – Evac – EM Light Test  
 2L/4L door overhead H2O SOVs  
 Buzz & vibration aft galley – may be compressor in Bulk Cargo for water pzn prior to APU start

2R Pax Entertainment/Power Port shutoffs

Lav Smoke Detectors, Mirror latch, H2O SOV, Toilet SOV, Waste Basket Fire Extinguisher

1R/4L Megaphone Compartment / 1L/4R = Rafts with ELTs/

Galley Power switches, Coffee Maker H2O SOV's

Door Arm/Disarm / Door power assist - Green LED flashing (not Red), disable switch panel cover flush.

Note: If the exterior door handle is not in/retracted, the door arming lever is prevented from moving to the armed position. It is spring-loaded to the in/flush position, but someone outside must bump it to the level position and it will retract. The door can then be armed.

1<sup>st</sup> Class Seat /video operations/electric + manual adjust door, tray table, swivel, work station, power port & headphone jack  
 FDCR – push lock IN to turn handle/open door.

E&E COMPARTMENT:

Gear Pin location – visit if time permits before flight. Aft gear pins are stored in the E&E compartment in a dark plastic box above the battery box, aircraft center, forward of the walkway on the LH side of the RH compartment and to the right of the battery.

Cockpit Voice RecorderQRH General Information 2.10 / 2-0-11

FAR 121.359 (a) states that “the cockpit voice recorder must operate continuously from the start of the use of the checklist (before starting engines for the purpose of flight) to completion of the final checklist at the termination of the flight.”

The Cockpit Voice Recorder c-b (located in the E&E compartment on the P110 panel at F6 and labeled VOX RCDR) is pulled after landing following any of these occurrences:

- Airplane accident
- Flight control system malfunction
- Incapacitated flight crewmember as result of injury or illness
- Failure of structural components of a turbine engine excluding compressor and turbine blades and vanes
- Inflight fire
- Inflight collision
- Damage to property other than the aircraft estimated to exceed \$25,000
- Inflight failure of electrical systems which requires the sustained use of an emergency bus powered by a backup source such as a battery, APU, or RAT to retain flight control or essential instrument.
- Inflight failure of hydraulic system that results in sustained

reliance on the sole remaining hydraulic or mechanical system for movement of flight control surfaces.

- Sustained loss of the power on both engines
- Ground evacuation

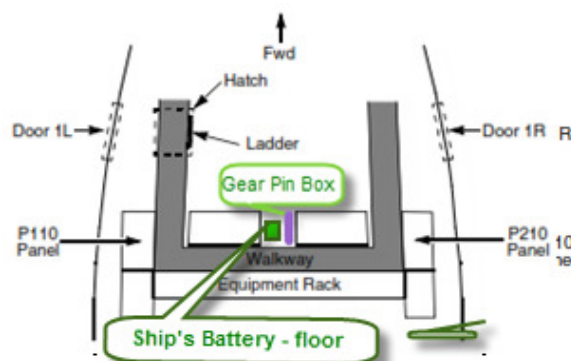
Delay pulling the Cockpit Voice Recorder c-b until after the evacuation and conditions are safe to re-enter the airplane.

- Hijacking

Upon landing at a hijacker's destination, the Cockpit Voice Recorder c-b is pulled and is to remain pulled during the return flight to the United States or to a base where the recorder may be removed for readout.

Deactivate the Cockpit Voice Recorder as follows:

- If AA Maintenance personnel are available, make a numbered E6 write-up to have the cockpit voice recorder circuit breaker pulled.
- If AA Maintenance personnel are not available, a cockpit crew member may enter the E&E compartment after all passengers have deplaned and pull the c-b (refer to Fire Protection, chapter 8 – Smoke, Fire, or Fumes – Supplemental Information for instructions on how to enter E&E compartment). Make a numbered Info to Maintenance E6 write-up that the cockpit voice recorder circuit breaker has been pulled.

CABIN SAFETY ITEMS:
Airplane General  
OM1 Systems 15.4 / 11-1-08

PBE (MEL), AED, IMK, ANC, Polar Suit (MEL), Halon, Pax O2

UNCOMMANDED STORM LIGHTS :

Training Email 1-20-09

There is an “Emerg Light Test Switch on both the L1 AND the R4 FA Panels. This switch works as follows: Press once to activate all of the Emergency Lights, including the Cockpit Storm, all Exit and also Exterior Emergency Lights. This test runs for about one minute, WITH NO EICAS message. Also interesting to point out, if

you press the switch during the one minute cycle, it starts the one minute cycle again. (The switch is a momentary style switch.) So what I surmised happened on our flight, was the FA sitting at R4 reached up over her head while in her jump seat, to adjust the interior work lights, and hit the switch by accident, saw the lights go on and tried to press it again and again to no avail. Finally they went out on their own after she stopped pressing it. (The test switch as you can see in the attached photos is not a guarded type switch.)

All of us discussed that this might have been VERY interesting rolling down the runway and having the Cockpit Storm Lights (Dome Lights) come on, especially on a dark stormy night.

We have already experienced divers for rodents and potential electrical problems, so it is not far fetched to think other Pilots might consider this, in one of these events, without proper information at hand.

So what can we do to keep this from turning into a potential problem? In my humble opinion I think we should at least address this problem at the training level and correct our manuals to reflect the correct switch locations. In addition the following are some additional items we could accomplish to help avert a costly incident.

I have attached both the Manual pages and Photos of the FA Panels to save you some time, and again sorry for the long dissertation if you already know about this issue. I just thought that it caught me off guard, and it happened to us luckily at an opportune time, maybe the next crew will not be as fortunate.

Facts:

- 1) Emer Lights/Test Switch over both L1 and R4 FA Jumpseats, (Not just L1)
- 2) This Test Switch Illuminates ALL Emergency Lights, Interior, Cockpit, and Exterior.
- 3) No EICAS Message during test 3) Can not stop Test
- 4) Test runs Approximately one minute and will start over with each press of the Test Switch. (Momentary Type Switch)

Recommendations:

- 1) Add this switch to our manuals – Currently our Manual states that this switch is ONLY located above FA L1 Position. (Actually located both above L1 AND R4)
  - 2) Our manual also states that you will get an EICAS message. You will not in test mode.
  - 3) Place in our manual that the “Test” will reset again to one minute each time the switch is pressed.
  - 4) Check FA Manuals for current information
  - 5) Make “Emer Light / Test Switch” a guarded type switch
- NOTE: Flight Ops has requested M&E put covers (guards) over the switches to prevent a recurrence.

**FLIGHT ATTENDANT BRIEFING:****Flight Attendant / Purser Briefing:**

FMI no longer requires that the Captain conduct a cabin crew briefing with all working flight attendants if possible.

**FMI 7.1-3 / 3-15-11****7.1.10 Flight Attendant / Purser Briefing**

A. Prior to gate departure, the Captain will give the F/A 1/ Purser the flight plan F/A briefing message and personally discuss the following items:

1. Number of Flight Attendants on board.
2. Any anticipated enroute delays.
3. Short-taxi situations and safety demo considerations (if applicable).
4. Preflight turbulence briefing: Include weather and turbulence forecast along the route of flight, the expected intensity and duration of forecast turbulence, plus notification procedures and required action in the event of a significant unexpected turbulence encounter. Brief that service may be suspended at the flight attendants' discretion if the conditions in the cabin warrant. If possible, a call should be made to the flight deck to report the cabin situation, including any injuries. If not seated at a jumpseat with an interphone, remain seated to avoid injury until instructed to resume duties by the Captain. Once cleared to resume duties, call the flight deck to report any injuries or abnormalities.
5. Appropriate security items.
6. Cabin or galley write-ups or deferrals in the E6 logbook.

**NOTE**

If the video briefing system is inoperative on 777, 767-300s, and 757EL (16-Seat First Class) a life vest demonstration must be given by a flight attendant. Adequate time must be allowed for this briefing along with the complete safety demo briefing.

7. Life vest demonstration on domestic flights with an overwater segment.
8. Gen. Decs / Customs Immigration forms (if required).
9. Coordination of cockpit crew meal service, if applicable.
10. On North Atlantic flights routed north of 66° north over Greenland, request the F/A 1/ Purser to review the F/A Safety Manual information concerning "66N Supplemental O Unit".
11. Any other unusual or pertinent issues relevant to the flight.

**Suggested F/A Briefing**

Technique : See [www.777cheatsheets.com](http://www.777cheatsheets.com) / Resources / Notes / CA Notes:

**Crew:** #FA's / # Pilots

**Security:** Considerations & Incidents / Levels / FAMs / Guard the cockpit / Door Code / Duress Code – Interphone / Pax Behavior / Cockpit will call & clear before exiting / Gnd Evac Button in flight?

**Medical:** Divert & airports & time / Pax Considerations:

\*Keep me posted / sec & med + CA incident backup\*

**Unplanned Evac:** Cockpit Notification

**Incident/Evac:** Assemble afterwards / Account for everyone / No media / CA and Purser ctc unions & company

**Comm:** Expect to speak w FB/FC on 3-4 pilot crew / identify name/station / after T/O / sterile EP comm /

**Cabin handset:**

Cockpit Alert/All Call = \*\* / disconnects normal call in prog / Subsequent \*\* calls added to the line / 31=CP / 54=Cabin All Call 1 chime conference

**EPs:** TEST / Time to divert wrt type emergency / Interphone considerations [i.d./location]

**Supp O2:** N of 66° Greenland + Afghanistan / + entering & leaving

**E6 Cabin Safety Items / NEF:** Before T/O

**Turbulence/forecast:** Seatbelt sign off/on request? / PA for unexpected [See Turbulence Attachment]

**General:** Galley Deferrals – brief (FO/FB/FC item)

Expected delays / Ground holding time / Short taxi

ETE / ETA – local time / 1 hour prior notice

Turbulence fcst, warnings – Interphone or PA

Gen Decs vs NS / Customs forms / Layover copy

Crew rest / Crew meals / Insert / Bunks: no luggage

Other Flight Considerations

E6 entries vs sterile = nlt 1 hr prior

2 Polar Suits: pressure packed – DO NOT TOUCH!

Door 1 Overhead (CA Note: Spare from other acft?)

DEL Wbd Meals: 4 different meals for cockpit? No salads?

Captain: change for \$50/\$5

**ASAP:** notify CA of any ASAP or other reports filed by FAs

**Hotel Security/Terrorism considerations/Crew Procedures**

**F/A POSITIONS:**

<b>First Class</b>		
<b>1 Purser</b>	<b>5 Galley</b>	<b>6</b>
<b>Business Class</b>		
<b>4 Galley</b>	<b>7</b>	<b>8</b>
<b>Coach</b>		
<b>2 Galley</b>	<b>3, 9</b>	<b>10, 11</b>

**POTABLE WATER:**

*Briefing Item: The potable water quantity indicating system has been deactivated – obtain a water slip or employee number /initials prior to gate departure. Additionally the compressor may cause a buzzing sound in the aft galley. The water system quantity has additionally been decreased to save weight.*

OM2 Airplane General 50.15 / 10-25-04

**Potable Water System**

The potable water system is supplied from three tanks located beneath the cabin floor. Potable water is supplied to the lavatory

sinks, the toilet flush system, and the galleys. The three tanks have a combined usable capacity of approximately 327 gallons. [Note: adjusted to 220 gal. to save weight] The tanks are normally pressurized with air from the airplane bleed air system. When bleed air pressure is not available, alternate pressurization is automatically provided by an electrically driven air compressor.

**INTERPHONE SYSTEM:**

*Technique: When enroute, use the handset to keep the PA from broadcasting in the crew rest compartments. See Attachment 2*

OM2 Communications 40.1+ / 10-25-04

All Call: 53 = 3 chimes + phone to intercom.

Cabin Alert: 55 = 4 chimes + phone to intercom.

Note: These chime both the MDCR and FDCR Individual stations:

71, 2, 3, 4 = L1, 2, 3, 4 doors

81, 2cp, 3, 4 = R1, 2, 3, 4 doors

\*\* = Cockpit Alert/Hi-lo chime/ + phone to intercom

**Priority calls** automatically disconnect lower priority cabin interphone calls. Priority calls placed while a priority call is in progress are automatically connected as a conference call. Pressing the audio control panel CAB (cabin) Transmitter Select Switch twice within one second places a priority call to the 1L / 1R FA stations. A station which is in use will be disconnected from the call in progress and connected to the flight deck.

NOTE: Flight deck initiated calls will not interrupt a current PA announcement from the dialed station.

\*\* A PILOT ALERT message is displayed on the EICAS display along with a high - low chime when the flight attendants needs to speak immediately with the flight deck.

NOTE: XX BUSY appears in the scratchpad when a cabin interphone call is attempted from the CDU to a handset that is off the hook. Line selecting <END CALL will remove the XX BUSY annunciation.

**NOTE: See Attachment – Interphone Guide****VHF DATA MODE:**

OM2 Communications 20.2 / 10-25-04

**Radio Communication Systems**

The radio communication system consists of the very high frequency (VHF) radio communication system, the high frequency (HF) radio communication system, and the selective calling (SELCAL) system.

**VHF Communication System**

Three independent VHF voice / data radios, designated VHF L (left), VHF C (center), and VHF R (right) are installed. Any VHF radio can be controlled by any radio tuning panel. The audio control panels are used to control voice transmission and receiver monitoring. VHF L is configured for voice communication only.

VHF C and VHF R can be configured for data or voice communication. However, only one VHF radio can operate in the data mode at a time. Data communication is normally selected on VHF C.

**Data Mode.** The data mode can be selected and deselected on the MFD COMM display or by pressing the Frequency Transfer Switch on the radio tuning panel. If the selected VHF radio is the default data radio (selected on the MFD COMM display), then the word DATA is displayed in the radio tuning panel ACTIVE Frequency Window. When a STANDBY frequency is transferred to the ACTIVE Window, DATA is displayed in the STANDBY Window. If a new frequency is selected in the STANDBY Window when DATA is displayed, DATA is replaced by the new frequency. Data can be returned to the STANDBY Window by selecting a frequency higher or lower than the allowable VHF frequency range. When a VHF radio is in the data mode, it is not available for voice communications. A VHF radio can be returned to the voice communication mode by transferring a voice frequency into the ACTIVE Frequency Window.

**Technique:** If the center radio will not set in DATA mode, go to the EICAS VHF COMM page to ensure the center radio is set to Data Mode Default. It may have transferred out due to power interruption or system reboot.

#### ACARS MISC 22 FP ELECTRONIC SIGNATURE:

ACARS M22 message: M22 EMP# last four of license

M22 = ACARS miscellaneous code 22

EMP# = 6 digit employee number (leading zeros are required)

Last four = 4 digit password (this is the last 4 digits of the captain's pilot certificate/license number)

**Responses:**

- DISPATCH RELEASE HAS ALREADY BEEN SIGNED
- DISPATCH RELEASE HAS BEEN SUCCESSFULLY SIGNED
- EMPLOYEE ID DOES NOT MATCH PIC OF RECORD
- DISPATCH RELEASE HAS NOT BEEN SIGNED
- PASSWORD DOES NOT MATCH PIC OF RECORD
- DISPATCH RELEASE HAS NOT BEEN SIGNED

#### COCKPIT CREW BRIEFING:

**Technique:** See [www.777cheatsheets.com](http://www.777cheatsheets.com) Resources / Notes / CA Notes:

You have 4 pilots – use your resources: emergency PA's = FB or FC / ground evac duties / C/P door & security procedures / fuel dump / EP's / FA cockpit O2 mask & door safety briefing

Suggested Preflight Briefing:

**COCKPIT MANAGEMENT:** Run a professional Flight Deck PIC / Sterile / Flight Pubs out - Runway Incursion / O2 FO owns Delay Codes, APU, Flaps

PF: decisions wrt fuel / speed / alt / economy / A+0

Visual Lookout / Positive Transfer of Acft Control

Doubt → get clarification for PF actions / all ATC clearances

Gen Decs: check & correct / keep 1 copy for layover

E6 – all check / ARM Codes / STATUS msgs clrd by Mx

**Cold Fuel:** This will apply ONLY when very low polar temps are forecast

Get lab Fuel Frz Pt number from Dispatch

Set Fuel T = Zpt + 3°

**COCKPIT SECURITY** – Call FA & clear hallway

DO NOT BLOCK DOOR when passing trays! / Min time open

Duress Procedures / Lockdown / Stay in bunks / Gnd Evac button

**Physical Breaks** – Brief FA: O2 & Door Security

**Hotel Security/Terrorism considerations/Crew Procedures**

Interphone: L=71,2,3,4 / R=81,2,3,4 / Cabin\*\*=CP Alert/HiLo Chime

55=FA Alert / 4 Cabin Chimes / All Station Conference

65=PA / 6\*=PA Override

Normal calls appear in sequence on the center CDU 'Call Queue'.

Cabin \*\* disconnects normal call, sets up C/P-Cab conference and subsequent \*\* calls are added to 'party line.' Display: **EICAS: CABIN ALERT / CDU: XX Pilot Alert.**

Once a call is established, another # may be dialed/line selected, to add that station to the party line (also may be line selected from CDU).

Line selecting DEL cancels Call Queue numbers.

**TO Briefing (CA or PF) Considerations:**

Designated PF / Abort considerations / TO Rwy & Departure / SE

TO profile / TO & Alt Wx / TO Legality / Rwy Conditions / Terrain,

MSA, Obstacles / Ldg Rwy Considerations

**Contingencies:** DI reqts / Holdover Time / EAI on-off / PF duties /

PM duties / FB-FC Duties: Gnd Evac Duties - Check TO Plan

Speed + Wgt - SE: Dump - LG Up - APU - GA considerations -

EP Checklist - PA's 6\* override - Cabin Intp all call 53=3, 55=4

chimes

**NO DERATE:** TW / CLO >ATOW / uncorrected MELCDL wgt adj

**TO MAX:** CONTAM RWY / LLWS / MAX IMP / Arpt Advsy

#### CREW REST/LUGGAGE:

**Crew Rest Seats 1A/2A. FB/FC luggage:** overhead storage bin above the crew rest seats or in the space under the seats in front of the crew rest seat (if available).

**Flight Crew Rest / Luggage Storage Area**

**OM1 General 10.3 / 9-15-06**

On international flights requiring more than 2 cockpit crew members, flight crew rest seats and luggage storage will be as specified in Flight Manual Part I. Luggage may be stored in the overhead storage bin located above the crew rest seats or in the space under the seats in front of the crew rest seat (if available). Flight Attendant luggage stowage will be as stated in the Flight Attendants Manual.

Cockpit crew bunks will be used as stated in Flight Manual Part I.

No items may be placed or stored in this bunk area at any time.

The aisle in front of the cockpit door is not to be used for First Class cart staging.

#### FMI 4.2-6 / 3-15-11

##### 4.2.8 Cockpit Crew Bunks

A. On flights scheduled for 12 hours or more, FARs require cockpit crew rest bunks be provided. Captains may not permit anyone other than working cockpit crew members to occupy these bunks.

B. On flights scheduled for less than 12 hours, use of crew rest bunks is at the discretion of the Captain.

##### 4.2.9 Cockpit Crew Rest Seats

Cockpit crew rest seats are reserved for cockpit crewmembers on International flights with additional F/Os assigned. These seats are:

777	1A - 3 pilot crews 1A and 2A - 4 pilot crews
-----	---

#### FAA INSPECTORS

##### FDAG Rules of Conduct 6.4.2 / 4-1-11

FAA Inspectors will normally not occupy a crewmember position in the performance of their duties. However, FAA Inspectors are authorized to occupy either pilot seat during a training flight provided a qualified Pilot Check Airman is in the other seat. An aircraft training period will not be extended to provide an FAA Inspector an opportunity to fly.

##### FAA Inspector OE Observation

##### FDAG 6.9.3 / 4-1-11

On segment(s) scheduled for observation by an FAA Inspector, changes requiring FAA rescheduling will be immediately coordinated through Crew Qualifications. An FAA Air Carrier Inspector observing the PIC OE always has the right to the first jumpseat. If a Check Airman is to perform a line check when an inspector is aboard, and the Captain is in his grace month, leaving no other opportunity to perform a line check, consider suggesting that he conduct a cabin check or observe you giving the Captain a line check. If the FAA Inspector maintains the primary jumpseat position, it is permissible for you to conduct the check from the secondary jumpseat. In this way, both parties are accommodated.

The FAA Inspector's job is to observe a new Captain demonstrate the Duties and Responsibilities of a PIC. During OE, should the Captain's performance be below average, the Check Airman should thoroughly debrief the Captain. The FAA Inspector may reserve the right to conduct another observation of that Captain's performance. An American Airlines APD may be substituted for an FAA Inspector provided all requirements of Exemption 6916 are followed.

**DOCUMENTS & CUSTOMS FORMS:**

Passports / Visas / Gen Decs (match NS, CA signs all, retain one copy for layover, HAZMAT, Crew Decs, lav, water, fuel, security hotel sheets, and in UK an unaccompanied bag form.

**FMI 17.6-1 / 3-15-11****17.6.1 International Border Regulations**

A. Crewmembers crossing International borders must comply with Customs, Immigration, and Agriculture Regulations of the country of entry. These regulations require the declaration of anything of value being brought into the country with payment of duty if applicable. Any plants, vegetables, fruit, or animals must be shown to the Agriculture Inspector and may be confiscated when importation is prohibited.

B. The Captain is responsible for ensuring that crewmembers clear Customs and Immigration in accordance with established procedures at each port of entry on International flights. Passenger Customs and Immigration formalities are, in most cases, delegated to AA or contract agency ground personnel. On non-scheduled flights, the contract agency will be specified in the Ops Order authorizing the flight.

**17.6.2 Documentation**

A. All crewmembers are required to carry a current passport. Crewmembers who fly to China are required to have a Visa. Crewmembers deadheading to India who are not listed on the Gen. Dec. (e.g. deadheading on another carrier) are required to have an India Visa.

B. All the necessary documents and forms to clear the aircraft, crew, and passengers are contained in a document envelope given to the F/A 1/ Purser prior to gate departure.

C. On all International flights, crewmembers are required to complete applicable customs declaration forms for presentation to customs officials upon arrival at the customs area.

D. Certain countries and ICAO agreements require documentation, such as the operating certificate, certificate of insurance, and aircraft noise compliance data, to be kept onboard the aircraft. These forms will be kept in the Crew Report Forms book (yellow book) aboard aircraft operating in foreign countries. In the event that a foreign aviation official requests a document which is missing, contact the local Station Manager to coordinate transmittal of the document to the foreign country officials. SOC can also assist. If a document is missing also make an E6 entry.

E. Foreign countries have the authority to audit AA flight crew member licenses, medical certificates and training records (ICAO Convention Articles 16 and 26). AA does not require crew members to carry training certificates or cards but upon request, AA will Email or FAX individual training records to foreign officials. See Chapter 3 for details.

*NOTE: DH Crewmembers whose names appear on the NS must clear LHR Immigration with the passengers. Meet the bus exit right past the AA Ticket counters around the corner at the edge of the canopy.*

*\*NOTE: pen and ink changes to the WB China Gen Decs are NOT authorized. A new copy must be printed.*

**E6 LOGBOOK ENTRIES:****FMI 5.3-3 / 3-15-11****5.3.6 Responsibility**

B. All discrepancies discovered by the flight crew will be entered in the E6 logbook by the flight crew whenever possible. The Captain will sign the logbook with name and employee number after the last discrepancy entered, regardless of whether the flight is a through flight or terminating flight. If no discrepancies are to be reported on leaving the aircraft, the Captain will enter "No Items" followed by name and employee number.

**FMI 5.3-6 / 3-15-11****5.3.12 Maintenance Sign Off**

A. At major maintenance airports, maintenance must make a balancing entry for all E6 logbook open entries, except those that may be signed by the Captain or other non-certificated personnel. These include, but are not limited to, wet carpets, a dirty windshield, etc.

B. At limited maintenance airports, a balancing entry is required only if any item must be corrected before the next flight. If corrective action is not required for a pirep at that airport, a balancing E6 entry is not required. Examples of pireps not requiring a balancing entry include items such as loose or missing cockpit trim, cabin and convenience items of non-airworthiness nature.

C. At any airport, regardless of the maintenance classification, outbound mechanical discrepancies may be flight crew placardable prior to gate departure or takeoff without a maintenance balancing entry. Refer to the MEL for requirements and procedures for flight crew placarding.

D. Maintenance deferrals are normally deferred in accordance with the provisions of the MEL or CDL. However, other deferral authority may be granted by the Nonessential Equipment Furnishings (NEF) List, General Procedures Manual (GPM) or Maintenance Manual (MM). All deferral E6 balancing entries must reference the authority for deferral.

E. Multiple balancing entries may reference the same MEL or NEF deferral authorization, if the associated PIREP(s) refer to

multiple similar items within the passenger cabin, excluding seat recline or control.

**FMI 5.3-6 / 3-15-11****5.3.14 Voiding an E6 Logbook Entry**

To void an E6 logbook entry made in error, draw a single line through each line of the entry and print the word VOID across the entry. The Captain's signature and employee number should then be written across the entry underneath the word VOID. Do not erase or obliterate any entry.

**E6 LOGBOOK ETOPS SIGN OFFS:****OM1 Preflight 10.2 / 10-25-10****FMI 17.3-3 / 3-15-11****17.3.6 Maintenance Release / Checks for ETOPS Operations**  
**Reference: 14 CFR 121.374(b)**

A. A maintenance check and release prior to ETOPS operation from the U.S. must be recorded as an "ETOPS 1" check in the Aircraft Release block of the aircraft E6 logbook.

B. A maintenance check required prior to ETOPS operations to the U.S. must be recorded as an "ETOPS 2" check in the Action Taken block of the E6 logbook.

**ETOPS 60/60 SIGN OFFS:****FMI 17.3-4 / 3-15-11****17.3.9 Verification of Repairs on ETOPS Aircraft**

Reference: 14 CFR 121.374 & AC120-42B

A. The FAA requires verification of proper operation following certain repairs, such as an engine change before the aircraft enters ETOPS portion of the flight. This confirmation can be accomplished by performing a Functional Check Flight, a domestic revenue flight (Non-ETOPS Verification flight), or before entry into the ETOPS portion of an international revenue flight.

B. When the non-ETOPS flight verification option is used, the following procedures apply.

1. Maintenance will make the following entry in the E6 logbook:  
**"AIRCRAFT RELEASED TO RESTRICTED ETOPS SERVICE IN ACCORDANCE WITH GPM VERIFICATION REQUIREMENTS. THE FIRST 60 MINUTES OF THE FLIGHT MUST BE WITHIN 60 MINUTES OF AN ADEQUATE AIRPORT DUE TO \_\_\_\_\_ COCKPIT CREW IS REQUIRED TO CONFIRM SATISFACTORY OPERATION OF \_\_\_\_\_, WITH AN INFO TO MAINTENANCE E6 LOGBOOK ENTRY."**

**MEL****3.1.C / 2-01-10**

C. The Captain may request equipment requirements above the minimums listed in this MEL/CDL whenever, in the Captain's

judgement, such added equipment is essential to the safe and prudent operation of a particular flight under the unique conditions prevailing at the time.

E. Any discrepancies noted at any airport may be Flight Crew placarded so long as the discrepancy allows Flight Crew placarding in the MEL/CDL/NEF. If the MEL/CDL/NEF specifies that the airplane may not depart from an airport where repairs can be made, refer to the criteria in paragraph 2.1.F

### 3.2 Equipment Malfunction at a Maintenance Airport

A. If maintenance action is required at a Maintenance airport, and Flight Crew placarding is not authorized, a flight crewmember shall advise the Agent/Dispatcher.

B. Items that are identified as Flight Crew placardable by the MEL/CDL/NEF may be placarded by the Captain prior to gate departure.

### NEF ITEMS:

FMI 5.3-9 / 3-15-11

5.3.27 NEF Items

The Nonessential Equipment and Furnishings List (NEF) contains items that do not impact airworthiness or passenger / crew safety (e.g., airfones, lavatory and galley items). The NEF is in the E6 logbook. The NEF is referenced by MEL item 25-99, and these items may be deferred in accordance with the MEL.

NEF items that require Dispatch notification (because they drive an operational requirement such as a Yellow placard requiring a maintenance check before each flight) will be listed on the Flight Plan.

### APU INOP:

MEL 49-1 / 2-01-10

49-1 Auxiliary Power Unit (MMEL 49-11-1)

#### (O) PROCEDURES

A. Flight is planned to remain within 180 minutes of landing at a suitable airport.

B. Flight is not dispatched out of the 48 contiguous states to Asia or DEL. Return to the 48 contiguous states is authorized.

C. Do not operate flight on North Polar Operations (North of 78°N).

D. Verify the Backup AC electrical power system is operative. Confirm the ELEC BACKUP SYS or ELEC BACKUP GEN L or R status and advisory messages are not displayed 30 seconds after both engines have been started.

E. APU BLEED AIR switch remains OFF.

#### (DP) PROCEDURES

A. Plan flight to remain within 180 minutes of landing at a suitable airport.

B. Do not dispatch flight out of the 48 contiguous states to Asia or DEL. Return to the 48 contiguous states

is authorized.

C. Do not dispatch on North Polar Operations (north of 78°N).

NOTE:

Verify ground pneumatics and electrical services are available at destination airport and alternate(s).

### ADIRU:

OM1 Pre-Flight 10.2 / 10-25-10

ADIRU Switch – OFF 30 seconds, then ON

- Verify that the ON BAT Light is extinguished.

- Verify that the OFF Light is extinguished.

### SCREW DRIVER:

May be deferred per PDL 25-99t.

Contact Mx & make the following E6 writeup: "E&E Compartment Access Panel screwdriver missing from Yellow forms binder."

The screwdriver will be replaced or the latch handle retaining screw removed and placed in the Yellow forms binder before flight.

### GROUND COOLING:

For ground cooling: BOTH Packs & Recircs – OFF

In LHR there is no ground cooling – the aircraft can become exceptionally warm in the summer – start the APU and ensure that the Pack and Recirculation switches are on.

Ground Air Conditioning Cart Use:

OM1 Systems 20.1 / 11-1-07

A low pressure pneumatic ground source may be used to supply conditioned air downstream of the air conditioning packs via two 8 inch conditioned air connectors. Before connecting ground air conditioning cart:

Pack Switches (both) – OFF

Prevents pack operation if bleed air is supplied to airplane.

Recirculation Fan Switches (both) – OFF

Allows cart to operate at maximum efficiency.

After disconnecting ground air conditioning cart:

Pack Switches (both) – AUTO

Recirculation Fan Switches (both) – ON

Hot Weather

During extended ground operations prior to flight deck preparations, consideration should be given to reducing the heat being generated on the flight deck. Window heat, radar, and other electronic components which contribute to a high temperature level on the flight deck may be turned off. All the flight deck air outlets should be open.

Both packs should be used (when possible) for maximum cooling.

Recirculation fans should be on for maximum cooling capacity. To maximize the cooling capacity of the air conditioning system, the flight deck side windows and all doors, including cargo doors,

should be kept closed as much as possible. All gasper outlets should be open and window shades on the hot (sun-exposed) side of the passenger cabin should be closed. Flight deck cooling can be improved by closing the flight deck door and window shades and lowering the side trays adjacent to the pilot seats.

### Note:

If only cooling air from ground air conditioning cart is supplied (no pressurized air from the APU or ground external air), then the TAT probe is not aspirated. Because of high TAT probe temperatures, the FMCs may not accept an assumed temperature derate. Delay selecting an assumed temperature derate until after bleed air is available.

### MDCR:

OM1 Systems 15.12 / 11-1-08

Main Deck Crew Rest (MDCR) Compartment

Some airplanes are equipped with a crew rest compartment near doors 3L and 3R. The MDCR supply shutoff valve opens during flight to let conditioned air flow into the MDCR. The MDCR shutoff valve closes when:

- The airplane is in flight below 25,000 feet, or

- Smoke is detected in the MDCR, or

- The airplane is on the ground and the left pack is on. The MDCR supply shutoff valve closes on the ground to prevent formation of ice in the MDCR air ducts.

On the ground, the inside temperature of the MDCR may be hotter than the temperature in the passenger cabin.

### OXYGEN:

OM1 Systems 15.10 / 11-1-08

Crew Oxygen Test

Oxygen Mask.....STOWED and DOORS CLOSED

Reset / Test Switch.....PRESS and HOLD

Verify yellow cross shows momentarily in the Oxygen Flow Indicator.

Emergency / Test Selector .....PRESS and HOLD

Continue to hold the Reset / Test Switch down and press the Emergency / Test Selector. Verify that the yellow cross shows continuously in the flow indicator.

Reset / Test Switch and Emergenc / Test Selector .....RELEASE

Verify that the yellow cross does not show in the flow indicator.

NORMAL / 100% Switch.....100%

Crew Oxygen Pressure.....CHECK STATUS DISPLAY

Verify that the pressure is sufficient for dispatch.

ETOPS O2: OM1 Systems 15.7 / 5-5-06: 1250 @ 70F

Crew Emergency Oxygen Use

OM1 Systems 15.11 / 11-1-08

Emergency oxygen should be used when necessary to provide positive pressure in the masks and goggles to prevent or evacuate contaminants. When positive pressure is not required, but contamination of flight deck air exists, 100% oxygen must be used. If prolonged use is required and the situation permits, oxygen availability should be extended by selecting normal flow. When oxygen use is no longer required, close the left hand oxygen compartment door, then press the Reset / Test Switch to restore normal boom microphone operation.

### CLOCKS – REQUIRED FOR NAT OPS:

OM1 Pre-Flight 10.10 / 11-1-08

Clock – SET Time / Date Selector – UTC

### TIRE PRESSURE:

OM1 Pre-Flight 10.9 / 2-2-11

- Tire Pressures – Check
  - Display Select Panel GEAR Display Switch – Press
  - Check minimum tire pressures:
    - Nose gear tires – Minimum 190 psi
    - Main gear tires – Minimum 200 psi.

If tire pressure is below minimum, notify Maintenance. Maintenance may apply a cold temperature correction.

### STAUS MESSAGES:

EICAS Messages:

OM2 Warning Systems 20.3 / 8-28-07

Systems conditions and configuration information is provided to the crew by [various] types of EICAS messages:

- EICAS status messages indicate equipment faults which may affect airplane dispatch capability.

HI6 MSG 2008-08-15:

BOEINGS LOGIC CONCERNING STATUS MESSAGES STATES "STATUS MESSAGES SHOULD BE CHECKED DURING PREFLIGHT AND POSTFLIGHT ONLY". STATUS MESSAGES TO DISPATCH, NOT OPERATIONS. THE FAA DEFINES TIME OF DISPATCH OR RELEASE FOR AIR CARRIER OPERATIONS AS "THE TIME THAT THE AIRCRAFT BEGINS MOVEMENT FOR THE PURPOSE OF TAKEOFF". THIS IS INTERPRETED BY THE FAA AS THE TIME THAT THE AIRCRAFT IS EITHER PUSHED-BACK FROM THE BLOCKS, OR THE FIRST MOVEMENT OF THE AIRCRAFT TAXIING AWAY FROM THE BLOCKS, OR IS TOWED FROM THE BLOCKS FOR THE PURPOSE OF TAKEOFF.

ANY MESSAGE REQUIRING CREW ACTION, OR THE SAFETY OF FLIGHT WILL APPEAR AS AN EICAS ALERT. BOEINGS SYSTEMS LOGIC INHIBITS THE STATUS MESSAGE CUE FROM ENGINE START TO 30 MINUTES AFTER TAKEOFF. ANY STATUS MESSAGE OBSERVED AFTER PUSHBACK,

DURING FLIGHT OR REMAINING AFTER APPROXIMATELY 3 MINUTES FROM HYDRAULIC SHUTDOWN, DUE TO PFC SELF TEST, DURING POST FLIGHT SHOULD BE RECORDED IN THE E6 LOGBOOK.

### FMC:

Flight AALXXX / Route Flight Plan / AA9XXXX

AIRLINE DATABASE – Check current electronic checklist is dated 01 Nov 07.

OM1 Pre-Flight 10.4 / 3-2-09

NOTE: Do not uplink route or performance data to the FMC until after the flight has been initialized by the JP\* entry in DECS.

OM1 Systems 66.2 / 2-9-10

Pre-Flight

ADIRU Switch.....OFF 30 seconds, then ON

The FMC power-up page should be the IDENT page.

\* If IDENT page is not displayed:

INIT REF Function Key.....PRESS

Displays INIT / REF INDEX page.

IDENT [ 1L ] .....PRESS

Displays IDENT page.

MODEL

[ 1L ] .....CHECK

Displays 777-200.1 or 777-200.3 (7CB and 7CC only).

NAV DATA.....CHECK

Verify that the NAV DATA identifier begins with "AA9". Any other number indicates an incorrect navigation database is loaded.

### NOTE

The correct navigation database must be loaded prior to takeoff.

ENGINES [ 1R ] .....CHECK

Displays TRENT 892.

FMC Active Nav Data Base [ 2R ] .....CHECK / SELECT

Check / select the nav data base dates based on the departure time. The data base becomes active at 0901Z on the first day in the range and expires at 0900Z on the last day in the range.

### NOTE

Nav data base cannot be changed in flight. When an active data base expires in flight, the expired data base is used until the active date is changed before the next flight.

\* If ACTIVE data base dates [ 2R ] are not current:

If date is not current, line select the current data base [ 3R ] to scratchpad then line select to 2R.

\* If inactive data base dates [ 3R ] are also not current:

Refer to MEL.

FMI 17.5-2 / 3-15-11

17.5.4 Navigational Procedures

A. FMC Initialization and Route Verification

1. The initial FMS position coordinates must be checked and verified by the Captain and F/O prior to gate departure using Jeppesen gate / ramp coordinates or AA Operations Advisory pages. This is not required if the FMS is initialized using GPS position.

2. After ACARS route up-link, or manual route loading, waypoint names will be displayed and verified by both pilots. One pilot will read waypoint names from the Navigation Display (HSI / ND) while the other pilot checks them against the flight plan or current ATC clearance.

### FLIGHT PLAN UPLINKS:

Record ALL clearances on the Master Flight Plan (FMI)

OM1 Systems FMS Navigation 65.4 / 5-1-07

Automatic uplink of data will not occur when the printed flight plan is requested in Operations using the JP\* or WBDF entries.

Prior to departure, manually request an uplink of route data through the FMC from RTE page 1, line 3L, ROUTE REQUEST. The route request will uplink the ROUTE, WIND DATA, PERF INIT, and TAKEOFF DATA.

After gate departure, the load closeout will be sent automatically to the printer. Automatic uplinks of Perf Init and Takeoff data to the FMC are not available after gate departure. However, Perf Init data may be manually requested through the FMC.

### FMS Loading - Email 4-28-09

**Subject:** RE: ACARS Route Request

If the jet came over from the hangar or the international terminal, it does matter. On a number of flights (out of the few that I get), I have guys telling me ACARS is inop and the route can't get loaded. About 80% of the time, flight 13 is in the box. By clearing that, the ACARS uplinks work normally. Not getting the uplink leads to all kinds of problems that we've seen recently, like the "phantom" takeoff data from a previous flight showing up. You need to load the flight number before you make the route request or you might be setting up a chain of events that leads to a MX delay or incorrect takeoff data.

Again, the FMC preflight procedure does not allow the flight number to be loaded if and when desired...

[Comment: load it iaw the Preflight Procedure BEFORE sending the FMC >Route Request<!]

Brian Will

777 Fleet Captain

**Sent:** Thursday, October 30, 2008 9:45 AM

**Subject:** RE: ACARS Route Request

All,

For any ACARS communication, nothing is required to be loaded. The ACARS Management Unit (MU) communicates directly with FOS on a contract basis regardless of what you've loaded in the CDU. The only exception to this is if FLIGHT # 13 is loaded--in this case, all ACARS requests are ignored by FOS. This number is used by Avionics Engineering to troubleshoot ACARS problems and by MX taxi crews so they don't log OUT and IN times.

#### The flight number is required for:

1. ATC datacomm -- CPDLC, ADS, etc.
2. Certain Aircomm functions (the new ACARS system being developed)
3. For certain international PDC requests which are coming online soon

Since its part of the CDU preflight, crews should enter the data. There are other things in the CDU that are not required prior to, or during, the flight like enroute winds. We are fine to go without these as long as we don't mind looking at INSUFFICIENT FUEL or USING RSV FUEL messages for 10+ hours. Prudent operating procedure has us uplink and update these winds during flight to help maximize the benefits from FMC performance calculations.

Again, crews should do it because it's part of the preflight procedure.

CA Brian Will, 777 Program Manager

#### UNABLE TO UPLINK DATA:

OM1 Systems, FMS Navigation 65.6 / 5-1-07

When trying to uplink data (e.g., winds) and it appears that the system is not processing the request, one reason may be that the FMC buffer is full. If the buffer is full, no more data can be uplinked until the buffer is cleared. To determine if the FMC buffer is full and to clear the buffer if required, perform the following steps:

Display the FMC COMM page by pressing the FMC COMM Function Key. This page displays the status of all uplinks. If UPLINK is displayed above one of the line prompts, select the related page(s).

Perform the required action for the uplinked data (i.e., Reject, Accept, Load, or Purge) on the related page(s). Once all uplink data is cleared from the buffer, additional data may be uplinked to the FMC.

[NOTE: You can also try deselecting DATA MODE on the #3 VHF radio to force the system into SATCOM MODE to get the FP and TPS downlinks.]

#### FLIGHT PLAN LOADING:

*Desired: Select approach, STAR, then transition to generate wind descent altitudes and T/D point.*

OM1 Systems FMC Procedures 66.1 / 11-1-09

STAR ROUTE 3 is unique to the FMS's manufactured by Honeywell to ensure the correct sequencing of waypoints for arrival. To ensure correct sequencing on arrival, it is important to correctly sequence the approach, STAR and any associated transitions. The procedures on the following pages titled Loading Route Data via Data Link and Loading Route Data Manually enables the FMS to construct the route from the departure runway via the SID, SID transition to the enroute structure, and then from the arrival runway back to the enroute structure via the approach, STAR, and STAR transition. Doing this allows the FMS to correctly insert and sequence waypoints associated with runway specific departures and arrivals.

#### FMC T/O PAGE:

*Do not request FMC TO Data uplinks. Set EO and ACCEL height as specified by TPS runway and noise abatement procedures. Note: EO height can vary for different flap settings and may vary for different runways. Standard: 1000/1000/600. Enter noise abatement altitudes as specified: the 1500' Thrust Reduction will uplink, but the 3000' Accel height must be manually entered on FMC T/O page 2.*

OM1 Climb-Cruise-Descent 10.5 / 10-25-10

Acceleration Height -- All Engines

Normal acceleration height is 1000 feet AGL. The altitude selected for acceleration and flap retraction may be specified for some airports. The minimum altitude for flap retraction is 400 feet. (FAR)

#### T/O DATA REQUESTS:

Notes: After JP\* in Ops or use COMM page to re-link

Runway change -- keep thrust/flaps same

Do not use FMC T/O Page to request TO DATA. It will only generate MAX with no Vmcg protection.

Takeoff Data Uplink:

OM1 Systems FMS Navigation 65.4 / 5-1-07

Uplink of takeoff data to the FMC is available through the COMPANY (ACARS) [EICAS COMM] TAKEOFF DATA REQUEST page for any runway listed in the Thrust / V-Speed section of the TPS.

If a new TPS is required, the TPS may be requested through the COMPANY (ACARS) TAKEOFF DATA REQUEST page. After the TPS is received, the takeoff data may be entered manually into the FMC or may be uplinked to the FMC by a second request selecting FMC UPLINK on the COMPANY (ACARS) TAKEOFF DATA REQUEST page. When requesting uplink of takeoff data to

the FMC from the COMPANY (ACARS) TAKEOFF DATA REQUEST page, ensure uplink request contains the same takeoff information (i.e., runway, thrust rating, flaps) as the TPS.

#### CAUTIONS

- **Do not** manually request takeoff data through the FMC TAKEOFF REF page because the uplinked data may not match the TPS.
- **Do not** use FMC calculated V speeds because the FMC may calculate a V1 speed that is below the VMCG speed. TPS / uplinked speeds are VMCG protected.
- **Do not** accept partial TAKEOFF REF page uplinks (only an updated CG, for example) unless a complete TAKEOFF REF page (all data fields contain data) for the intended flight leg has previously been received and accepted. If a partial uplink is received and any fields on the TAKEOFF REF page are blank, dashes, or boxes, reject the uplink and request new takeoff data via COMPANY (ACARS) TAKEOFF DATA REQUEST page or enter the TAKEOFF REF data manually.

#### REF DATA UPLINK DISCREPANCIES:

**RE: Fleet Captain Email 8-15-08**

FYI. Here are some questions highlighting issues we see with takeoff ref data. When we load uplinked Takeoff Ref data before fueling is complete it locks the data (speeds) at that weight. We will work on a new procedure for loading data in the near future as we learn more.

When you fly try waiting until fueling is complete before loading the Takeoff Ref data.

Thanks, Jim Dees, Fleet Captain-B777, American Airlines  
817-967-5715 / 817-939-4374-Cell / [jim.dees@aa.com](mailto:jim.dees@aa.com)

We have three separate issues:

1. The FMC retrieves stale data (from the previous flight) when we uplink the CG, if no Takeoff Ref data has been uplinked or loaded. To the flight crew, this retrieval of stale data has the appearance of an uplink.
2. If the aircraft is not fueled when we uplink the Takeoff Ref data, the uplink is rejected. This is caused by a check in the software that compares the uplinked weight to the current aircraft weight.
3. Occasionally at engine start, the FMC deletes the V-speeds.

#### FMC APPROACH:

*Note: if Vref is > 160K = plan Flaps 25 if not SE for return to airport for landing.*

*Technique: Heavy weight consider requesting 260K below 10,000' Reference Performance Charts:*

*Dump = performance issue*

*Can land max weight*

*Climb Limited Landing weight considerations*

**20.10 TAXI - TAKEOFF**

10-25-10

**777 Operating Manual AA****RNAV SID Procedures**

These procedures are applicable for published RNAV SIDs or if LNAV roll mode will be used to fly the departure.

**NOTES**

- RNAV SIDs and STARs must be loaded from a current navigation database, they may not be manually constructed ("built") on the LEGS page. Manual modifications may be made as necessary to comply with ATC clearances (e.g., "direct to" routings).
- For an RNAV SID, a flight director must be operative and the LNAV roll mode must be used after takeoff.

**Do not accept an RNAV SID clearance if:**

- The runway position, identification, or lateral track depiction on the ND is inaccurate
- NAV UNABLE RNP EICAS message is displayed
- There is a loss of FMS or lateral navigation flight guidance mode (e.g., flight director and / or LNAV mode inoperative).

**Prior to Takeoff:**

ND Mode Selector .....MAP

Verify proper runway symbol, runway ID and lateral track are depicted on the Navigation Display (ND).

Verify from the FMS LEGS page and ND that the RNAV waypoints and altitude constraints agree with those depicted on the Jeppesen chart and an active waypoint is depicted in 1L.

LNAV .....ARM

LNAV may be armed on the ground and will become active at 50 feet AGL. Heading Select (HDG SEL) may be used if needed to comply with an ATC clearance.

**After takeoff at 400 feet AGL:**

LNAV .....VERIFY ENGAGED

Heading Select (HDG SEL) may be used if needed to comply with an ATC clearance.

**■ If there is a change in RNAV SID, RNAV SID transition, or departure runway:**

DEP ARR Function Key .....PRESS

DEP [1L] .....PRESS

Departure Runway .....SELECT

SID .....SELECT

TRANS .....SELECT

EXEC Key .....PRESS

Following the modification, verify proper runway symbol, runway ID and lateral track are depicted on the ND.

**FMS / LEGS VERIFICATION:**

FMI 17.5-2 / 3-15-11

**17.5.4 Navigational Procedures****A. FMC Initialization and Route Verification**

1. The initial FMS position coordinates must be checked and verified by the Captain and F/O prior to gate departure using Jeppesen gate / ramp coordinates or AA Operations Advisory pages. This is not required if the FMS is initialized using GPS position.

2. After ACARS route up-link, or manual route loading, waypoint names will be displayed and verified by both pilots. One pilot will read waypoint names from the Navigation Display (HSI / ND)

**20.12 TAXI - TAKEOFF**

10-25-10

**777 Operating Manual AA****FMS Engine-Out (EO) SIDS**

Before departing from a runway with an FMC EO SID available, the crew must brief and review the procedure by verifying waypoint sequence (speed and / or altitude constraints) on the LEGS page and ND to ensure accurate coding of the procedure compared to the applicable AA Ops Ad page.

**Prior to Takeoff:**

DEP ARR Key .....PRESS

DEP [1L] .....PRESS

Departure Runway .....SELECT

EO SID .....SELECT

ND Mode Selector .....PLN

ND Range Selector .....AS DESIRED

LEGS Key .....PRESS

STEP [6R] .....STEP THRU EO SID

One pilot will read each waypoint from the ND, while the other pilot compares it against the AA Ops Ad page. Confirm that each ND waypoint is connected with a white dash line.

ERASE [6L] .....PRESS

ND Mode Selector .....MAP

ND Range Selector .....AS DESIRED

**During Takeoff:**

If an engine failure occurs prior to flap retraction, the FMC automatically selects the EO SID as a route modification:

LEGS Key (If not already displayed) .....PRESS  
Confirm desired EO SID is displayed.

EXEC Key .....PRESS

LNAV .....SELECT or VERIFY ENGAGED

Heading Select (HDG SEL) may be used if necessary to track EO SID.

**■ If EO SID is not desired:**

LEGS Key (If not already displayed) .....PRESS

ERASE [6L] .....PRESS

while the other pilot checks them against the flight plan or current ATC clearance.

*Technique: acknowledge all FP wpts – "straight line" if not on FP.*

OM1, Systems, FMS Navigation 65.6 / 5-1-07

**Legs Verification Check**

Following the route verification check, the flight crew will perform the legs verification check for the complete flight plan route (including applicable SID and / or STAR) and note or resolve any discrepancies. If the active route is modified (e.g., change in departure, arrival, or route), complete the legs verification check to confirm that the amended portion of the route is correct. On flights where only a portion of the clearance has been received (such as international operations across the North Atlantic) the legs verification check must be accomplished for the entire route as depicted on the flight plan so that discrepancies between the CDU and flight plan waypoints are noted and / or resolved.

ND Mode Selector ..... PLN  
ND Range Selector ..... AS DESIRED  
LEGS Function Key ..... PRESS  
STEP [ 6R ] ..... STEP THRU ROUTE

One pilot will read each waypoint from the ND, while the other pilot checks it against the flight plan or clearance. Confirm that each ND waypoint is connected with a solid magenta line.

PROG Page 1 ... CHECK TOTAL DISTANCE

ND Mode Selector ... MAP

ND Range Selector ... AS DESIRED

**STARTING:****STARTING:**

Interrupting Engine Starts / Autostart:

OM1 Starting 15.8 / 11-1-06

Autostart corrects for:

- No EGT rise
  - A hot start
  - A hung start
  - No N1 rotation
  - A compressor stall
  - A starter shaft failure
  - Insufficient starter air pressure
  - A start time that exceeds the maximum starter duty cycle time.
- Accomplish the ABORTED ENGINE START checklist for the following abort start condition:
- There is no oil pressure indication after the EGT increases.

**Procedure:**

Fuel Control Switch – CUTOFF

Start Selector – START

Motor engine for 30 seconds

Start Selector – NORM

**ENGINE WARMUP:**

OM1 Taxi-Takeoff 10.6 / 3-2-09

**Before Takeoff Engine Warm Up Requirements**

Before takeoff, do not exceed power required for taxi for approximately:

- 3 minutes when engines are warm (engines were shut down for 1.5 hours or less).
- 5 minutes when the engines are cold (engines were shut down for more than 1.5 hours).

Engine oil temperature must be above the lower amber band before takeoff.

**TAXI:****WEIGHT RESTRICTED FLIGHT & OVERWEIGHT TAXI:**

FMI 8.1-2 / 3-15-11

Gate Departure Procedures

H. Do not release brakes until doors are closed and the ground man and Ramp/Ground Control have cleared the aircraft to push or powerback. A weight restricted flight will be held on the gate by the crew chief until the load agent has determined the final load numbers have not caused the aircraft to exceed any certificated weight limitations. A premature brake release that triggers an "out" event while the aircraft weight is out of limits will automatically be considered an overweight taxi, even if the aircraft has not departed the gate. (See Section 7 for information about reporting delays at the gate).

8.1.3 Taxi Exceeding Maximum Taxi / Ramp Weight

If aircraft brakes are released, triggering an "out", and the aircraft exceeds maximum taxi / ramp weight, an overweight taxi has occurred. Make an E6 entry with actual aircraft weight at brake release. Maintenance will determine if an inspection and what type is required. Maintenance will relay this information to Dispatch.

8.1.4 Taxi Exceeding Max Zero Fuel Weight

Correct the overweight condition prior to takeoff. Coordinate with Ground and/or Ramp for resolution location. An E6 entry or maintenance inspection are not required unless the aircraft is accidentally flown in this condition.

8.1.5 Exceeding Maximum Takeoff Weight

The Captain will burn down fuel to the maximum takeoff weight prior to takeoff. Fuel burn or excess ground time may require notification to Dispatch. Refer to Company Communications in Chapter 11. This may be done by relaying a message through station operations personnel.

**DELAYS:**

FMI 7.2-3 / 3-1-11

7.2.3 Company Arrival Control (CAC) Delays

A. During irregular operations, SOC may impose a ground delay on flights departing for a hub airport. The purpose of the program is to prevent overlapping complexes and increased congestion. SOC, after consulting with station management, will implement the CAC program. The Dispatcher will issue a specific departure time for flights being delayed and confirm this revised departure time with the station by telephone.

B. If the CAC delay is known prior to the release calculation, the flight plan will include an appended message and / or the release remarks will indicate the planned delay and the reason.

C. Captains should not depart the gate earlier than the quoted CAC departure time. If the station cannot accommodate the flight

on the gate due to operational constraints, the flight will be expected to absorb the delay on the ramp or taxiway prior to departure.

7.2.4 ATC Delayed Departure (RFD/MISC 2)

A. The Captain has sole responsibility for the decision to identify and transmit an ATC delayed departure message via ACARS or voice call.

1. Section 15.A.12 of the Basic Agreement with the APA provides that when the Captain elects to delay starting engines due to quoted ATC takeoff delays, flight time will, at the option of the Captain, be considered to begin at the time the aircraft would normally have departed. In this situation, the OUT time will still be established at the moment the aircraft first moved for the purpose of flight, and the block time will not include the delay time. The RFD entry will establish the time at which the aircraft would have departed had the Captain not elected to take the delay at the gate. Crew pay and credit will commence at the time indicated by the RFD entry. The Captain has the option of either departing the gate and taking the delay at another location on the airport or remaining at the gate with the engines shut down.

2. Rescheduled departures due to ATC delays, AA quota flow delays or delays resulting from maintenance, aircraft servicing, etc., do not qualify for RFD departures. The mere fact that the cockpit crew is ready for departure does not qualify for an RFD.

3. For the ACARS entry sequence, see your respective aircraft Operating Manual.

4. If the brakes are released prior to notification of an ATC delay, make the appropriate ACARS entry or contact your Chief Pilot.

7.2.5 Ramp Congestion Delays (Misc 59)

When an aircraft is ready to depart, but is blocked from beginning its pushback, power back or taxi away from the gate because of aircraft or vehicular traffic, the Captain will not release the brakes, but instead will enter a Misc 59 delay into ACARS indicating the time when the aircraft was ready to move. Crew pay and credit will begin based on the Misc 59 entered time. If notified by ACARS that a Misc 59 entry cannot be accepted, the Captain will contact the Chief Pilot. The Captain's decision is final.

**NOTE**

Avoid using Code 59 (the code for ON to IN arrival delays caused by gate obstruction or gate unavailability) when a MISC 59 message is intended.

"HEAVY" C/S:

FMI 11.2-1 / 3-15-11

Flight Call sign identification

C. "HEAVY" added to Call sign (FAA Order 7110.65 Appendix A)

1. In U.S. airspace, when operating aircraft capable of takeoff with weights of 300,000 pounds or more, add the word "Heavy" to

the aircraft's call sign, i.e., "American Seventy One Heavy." Use this form of identification in all air / ground communications in the terminal area. It is not required during enroute communications.

2. For operations outside of the U.S., the word "Heavy" applies to aircraft capable of takeoff with weights of 300,000 lbs. or more and is only required upon initial contact with tower and approach / departure control. Over Canadian airspace use the term "Heavy" on each new frequency initial contact.

**RUNWAY CHANGE:**

Rwy / SID / Transition – reenter & verify SID on FMS LEGS page.

**BREAKAWAY THRUST:**

*Technique: Set 30% N1 until the aircraft begins to move – beware of jet blast on the ramp, in confined areas and with following traffic. Use 35% max if rear of aircraft is clear and it will not move at 30% N1.*

*Recommend advance throttles one at time, using one throttle for reference. For example: start with a one to one-half knob forward on the left, then match with the right, then a quarter, then an eighth. Pushing both throttles up simultaneously leaves you with no reference point, and once the engines spool-up through 30% N1 they will keep going and rapidly overshoot.*

**CARBON BRAKES:**

OM1 45.22 / 4-30-10

Carbon Brake Life

Brake wear is primarily dependent upon the number of brake applications. For example, one firm brake application causes less wear than several light applications. Continuous light applications of the brakes to keep the airplane from accelerating over a long period of time (riding the brakes) to maintain a constant taxi speed produces more wear than proper brake application.

During taxi, proper braking should involve applying brakes to decelerate the airplane, releasing the brakes when the lower speed is attained and allowing the airplane to accelerate, then repeating.

**SINGLE ENGINE TAXI:**

OM1 Taxi-Takeoff 10.2 / 3-2-09

Single engine taxi should be utilized as often as possible, conditions permitting. Good judgement and safe operating practices should always prevail.

Single engine taxi is authorized, except:

- On wet or slippery taxiways
- In icing conditions
- Where tight turns in confined areas may be expected.

Single engine taxi may be conducted without the APU operating.

Single engine taxi may be accomplished using either engine. Consider the following:

- Effect of jet blast on equipment and personnel
- Direction of turns and length of taxi
- Minimum times for engine warm-up (3 or 5 minutes) and cool-down (1 minute)
- Aircraft weight.

If conditions change making single engine taxi unsafe or impractical, start the other engine or stop the aircraft and request a tow-in. If a significant ground delay is encountered, both engines may be shut down with ATC concurrence.

#### NOTE

During extended ground times, a single bleed source may not be sufficient to cool the cabin effectively. If the APU is required to supplement cooling use the following procedure:

APU ..... START  
BLEED ISLN switch (for the engine running) ..... CLOSED  
[Allows APU bleed air to operate the opposite pack.]

Approximately 5 minutes prior to takeoff:

BLEED ISLN switch (for the engine running) ..... AUTO  
Engine ..... CROSSBLEED START

[Starting approximately five minutes prior to takeoff allows time to start, comply with the 3 or 5 minute engine warm-up requirement, and complete the Before Takeoff checklist.]

The following exhaust velocities and distances are provided (these values will vary with air temperature and tire adhesion with the ramp / taxiway surface):

N1	50 MPH	35 MPH
26%	160 ft.	332 ft.
35%	274 ft.	479 ft.
43%	380 ft.	615 ft.
51%	501 ft.	771 ft.
62%	680 ft.	1000 ft.

#### CAUTION

Use minimum thrust to taxi. Ensure thrust has stabilized prior to making additional throttle inputs to get the airplane rolling. If thrust on one engine exceeds 35% N1, use crossbleed start procedures and taxi on both engines.

#### TAXI:

Check that the hand mic is NOT wrapped around the tiller!  
Centerline taxi reference = inside thigh.

Wingtip, gear, engine exterior visual references:

Wingtips: On-side = side window rear 2nd rivet

Far side = side window lower rear corner

Gear: On-side = front window post inside corner

Far side = center window post inside corner

Engines: On-side = front window post outside corner

Far side = center window post outside corner

Anomalies: Refer to QRH LANDING GEAR, Memo/Status Messages for an EICAS "ANTI SKID INOP" or "MAIN GEAR STEERING" message. You may stop the aircraft and then slowly rotate the nose wheel steering full left and full right three times which may resolve the problem. Refer to QRH and call Mx.

If the 1L (or any) door will not ARM, the exterior handle may not be in the flush stowed position. It requires someone outside the aircraft on a work stand to bump the handle level so it springs back into the flush closed position.

Turn clearance, speed & lead point:

180° = 156' (see TAXI & PARKING)

Wingtip radius = 145' Acft = 199'-11"W x 209'-1"L

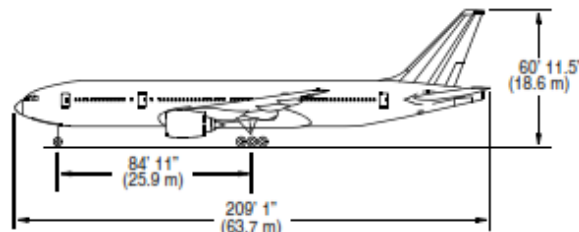
Gear = 36' apart

Do not attempt to make a turn away from an obstacle within 15 feet (4.6 m) of the wing tip, or within 51 feet (15.7 m) of the nose.

NOTE: The wing tip travels outboard about 5 feet and travels 35 feet in front of the nose.

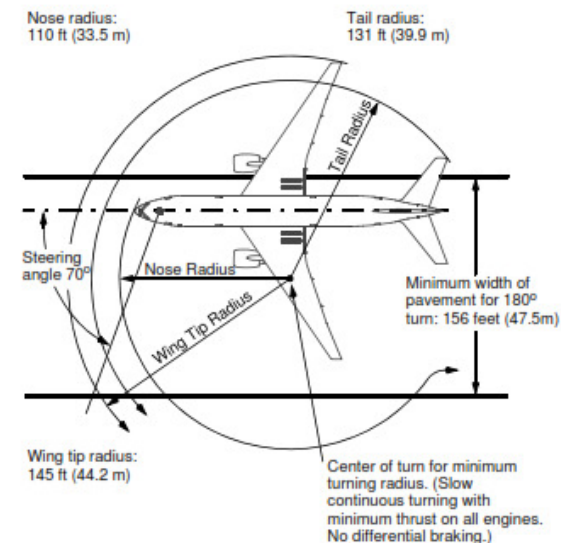
Technique: The NG can scrub during 90° turns at ~10kts, or 7kts on damp taxiways. For a 90° turn, lead as the perpendicular taxi line approaches abeam your shoulders, and then smoothly initiate full tiller after the line passes behind you – remember the NG is behind the bunks near the leading edge of the 1L door when steering on narrow taxiways. Then lead out of the turn in reverse order.

The aircraft can stagnate in a 90° turn if the speed decreases below about 7kts. In many gate areas you cannot add power. Therefore if the gate is not ready, allow some runup room to get the airplane started rolling and up to speed before initiating a turn in to the gate to preclude stopping for a tow.



#### Minimum Turning Radius

The wing tip swings the largest arc while turning and determines the minimum obstruction clearance path. All other portions of the airplane structure remain within this arc.



#### CAUTION

Do not attempt to make a turn away from an obstacle within 15 feet (4.6 m) of the wing tip, or within 51 feet (15.7 m) of the nose.

#### NOTE

The wing tip travels outboard about 5 feet and travels 35 feet in front of the nose.

#### TAXI SPEED & BRAKING:

OM1 Taxi-Takeoff 10.4 / 3-2-09

A turn should not be started until sufficient forward speed has been attained to carry the aircraft through the turn at idle thrust. Maximum speed for a turn of 90° is 10 knots. To the pilot the aircraft appears to be moving slower than it actually is due to the cockpit height above the ground. The ND GS display should be used to determine actual taxi speed. Normal taxi speed is approximately 20 knots, adjusted for conditions. On long straight taxi routes, speeds up to 30 knots are acceptable, however at speeds greater than 30 knots use rudder pedal steering only. When approaching a turn, speed should be slowed to an appropriate speed for conditions. On a dry surface, use approximately 10 knots. Avoid "riding" the brakes to control taxi speed. Reduce speed with a steady brake application and then release the brakes to allow them to cool. Braking to approximately

15 knots and subsequent release of the brakes will result in less heat build-up in the tires and brakes than when the brakes are constantly applied. Under normal conditions differential braking and braking while turning should be avoided.

**NOTE:** High taxi speeds combined with heavy gross weights and long taxi distances can result in tire sidewall overheating.

#### GRINDING NOISE:

In the aft galley may be PFC actuators – verify with OM.

OM1 Sys Flight Controls 55.1 / 10-1-05

Rudder Vibration Noise on the Ground

Noise described as loud grinding or growling in the aft galley may be heard during taxi-out or ground operations. One source of the noise is known to be inherent in the operation of all primary flight control actuators and is considered normal operation. To determine if the noise is from this source:

Primary Flight Computer Disconnect Switch ... DISC

The primary flight computers are disconnected from the flight control system and places the flight control system in the direct mode.

Rudder Pedals ... MOVE

■ If the noise is not heard:

No action is required. The noise is due to the digital nature of the primary flight control system.

Primary Flight Computer Disconnect Switch ... AUTO

NOTE: After returning Primary Flight Computer Disconnect Switch to AUTO, confirm EICAS caution message PRI FLIGHT COMPUTERS is not displayed.

■ If the noise is still heard: Contact Maintenance.

#### GROUND INTERRUPTION CONSIDERATIONS:

*Technique: Possible consequences: loss of slot time (LHR in particular – notify LHR Delivery if you do not have clearance, APIS security clearance, or are 10 minutes or more late (see 10-7 pages), or FE loss of Russian airspace entry time – you could be recleared on a different route or at a different altitude and require additional fuel. If the aircraft is moved maintenance must complete an exterior ETOPS Inspection and sign it off.*

#### ETOPS GROUND INTERRUPTION:

ETOPS Maintenance Check Policy – Ground Interruption

FMI 17.3-3 / 3-15-11

5.8 ETOPS Maintenance Check Policy – Ground Interruption

In the event that an ETOPS aircraft experiences a ground interruption (see Ground Interruption - Section 8) for maintenance reasons after the accomplishment of an ETOPS check, it will be necessary to redo the exterior portion of the ETOPS check, inspecting wheels, brakes, fuselage, etc. It is not necessary to accomplish the cockpit portions of the check unless there is a flight crew change. This check accomplishment must be entered

and signed off in the E6 logbook. The portions of the check, which were not required by this paragraph, are to be marked N/A G.I. (Ground Interruption).

**Note:** A Ground interruption for non-maintenance related reasons (e.g., loading a late bag, boarding a passenger, etc.) does not require an ETOPS Check. The ground interruption policy does not apply, nor are checks required for ground interruptions initiated for ATC holds or deicing.

#### HOT ITEM – RUNWAY INCURSIONS:

Runway Incursions

*Technique: If you need to look inside at your charts and you cannot stop the aircraft, inform the other pilots and consider allowing the F/O to taxi momentarily while you are head down (technique).*

FMI 8.1-3 / 3-15-11

#### 8.1.7 Taxiing

A. Do not taxi until an ATC clearance is received. The aircraft will not be moved until both the Captain and First Officer verbally confirm the aircraft taxi route is clear on their respective sides.

B. The Captain and First Officer will reference the airport diagram to ensure the taxi clearance is being followed correctly.

C. Pilots will not perform any before takeoff or head-in-the-cockpit activity until clear of the ramp.

D. No aircraft may be taxied on a runway or taxiway unless a specific clearance has been received to cross or take the runway. A clearance to "taxi to" a runway is NOT a clearance to cross or taxi on any runway, active or closed, unless specifically authorized by ATC. Clearance to cross another runway will not be issued until the aircraft has crossed the previous runway. EXCEPTION: ATC may authorize crossing multiple runways in a single clearance if the runway centerlines are less than 1000 feet apart.

E. Both pilots will monitor the appropriate tower frequency when number one to cross an active runway. When cleared to hold short of or cross an active runway, the Captain and First Officer will verbally confirm the clearance with each other.

F. (AIM, Pilot/Controller Glossary) A taxiing aircraft approaching a runway is "clear of the runway" when all parts of the aircraft are held short of the applicable holding position markings.

G. The Captain will notify the #1 Flight Attendant as soon as possible when a short taxi for takeoff is anticipated.

H. At Captain's discretion, single-engine taxi may be conducted across active runways.

**Note:** See Flight Ops Info Bulletin 2007-9 Reducing Runway Incursions

FMI 5.4-1 / 3-15-11

#### 5.4.3 Taxi Guidelines

##### A. Runway Incursion Prevention Measures

Airport surface operations require strict attention and constant situational awareness. Sound flight deck operating discipline enables the flight crewmembers to properly plan taxi operations with the same level of attention given to planning other phases of flight.

Several accidents / incidents have resulted from inadequate or misunderstood communications between the tower and flight crewmembers (phraseology, readback and hearback). Clear understanding of instructions should never be compromised, especially during busy times when the frequency is congested.

Do not allow other flight deck duties and non-ATC communications to divert attention from the safe movement of the aircraft, especially at critical times, such as runway crossings and transitioning through complex taxiway intersections.

Flight crewmembers should use a "continuous loop" process for actively monitoring and updating their progress and location during taxi. This includes knowing the aircraft's present location and mentally calculating the next location on the taxi route that will require increased attention.

For specific phase-of-flight procedures, refer to the appropriate FM Part I sections and the Aircraft Operating Manual.

#### BEFORE TAKEOFF:

#### FUEL:

*Technique: Take into account taxi time, airport and weather or SWAP / dep delays, No Alternate Dispatch Fuel, Rerelease Fuel, ETOPS and destination forecasts, and any other considerations and call dispatch to adjust fuel load as required prior to departure. If approaching Min Takeoff Fuel during taxi, contact Dispatch to see if alternate, ETOPS or Rerelease fuel requirements can be safely adjusted to preclude returning to the gate and refueling. Note: The aircraft burns 3600 PPH at idle – use 4000PPH for taxi fuel burn. The APU burns 600 PPH.*

FMI 6.2-1 / 3-15-11

#### 6.2 FUEL REQUIREMENTS

##### 6.2.1 Pilot-Dispatcher Communications

Reference: 14 CFR 121.601

The FARs make it clear that the Captain and Dispatcher are jointly responsible for all aspects of preflight planning, including fuel requirements. Their judgment and experience are indispensable elements in the preflight planning process. However, when the judgment and experience of the Captain and Dispatcher indicate a deviation from the fuel policy is necessary, it is vital both parties clearly agree and understand the reasons for the deviation and those reasons are clearly communicated.

**MIN TAKEOFF FUEL:**

FMI 8.2-1 / 3-15-11

**8.2.2. Minimum Takeoff Fuel**

Prior to start of takeoff, the Captain will confirm the fuel quantity is no less than minimum takeoff fuel (MIN T/O) shown on the dispatch release plus ballast fuel if required. If fuel quantity (minus ballast fuel) is less than MIN T/O fuel contact Dispatch and obtain an amended release or return for fuel top-off.

**ND & FMC:**

OM1 Taxi-Takeoff 15.2 / 6-1-10

**Before Takeoff Expanded Checklist:**

MCP / ND.....CHECKED / RUNWAY XX

- MCP set as appropriate for departure.

- Ensure the correct runway is displayed and the correct lateral track is depicted.

TRANSPONDER.....TA / RA

Verify transponder code is correct and select TA / RA.

When Taking Position on the Runway

- Both pilots will check the final approach area is clear of traffic.

- Both pilots will crosscheck runway versus airplane heading and confirm correct takeoff runway.

OM1 15.3 / 5-1-06

**MFD Set Up for Display of Secondary Engine Instruments**

The lower center MFD should normally be left blank for takeoff, inflight, on approach, and after the Before Landing checklist is verified, to reduce the display of unnecessary information and to ensure that the "pop-up" feature functions properly to alert the crew of a secondary engine parameter exceedance. The full display of the secondary engine instruments (indications), either on a selected MFD or compact format on the EICAS is strongly discouraged.

Verify proper runway symbol, runway ID and lateral track are depicted on the Navigation Display (ND).

Verify from the FMS LEGS page and ND that the RNAV waypoints and altitude constraints agree with those depicted on the Jeppesen chart and an active waypoint is depicted in 1L.

———— Supplemental Information ————

The FMS may command up to 25° bank angle (30° if necessary to stay on the track) with LNAV active. For this reason the pilot-flying must comply with the airspeed(s) specified by the procedure.

It may be necessary to delay flap or slat configuration to comply with an airspeed constraint. If the departure procedure or route does not start at the end of the runway, it may be necessary to use heading select to intercept the desired course for NAV capture per the departure procedure. At any time during the

departure, if the airplane is incapable of tracking the desired course, advise ATC and request a revised clearance.

**[NOTE: If the first WPT on the SID is behind the aircraft/on the airport, you may need to pre-select an inbound course to the second waypoint on the SID: Select the second waypoint to (1L) DIRECT TO, and then (6R) INTC CS TO – verify that the inbound LNAV course to the second waypoint overlays the published SID track. This will ensure the aircraft will intercept and LNAV along the published SID track, rather than leveling off in Heading Hold "NOT ON INTERCEPT HDG".]**

**HI6: SUBJECT: EO ACCELERATION HEIGHT**

(date unknown)

TO: B777 PILOTS

**AS A REMINDER, THE ENGINE-OUT ACCELERATE ALTITUDE/HEIGHT CAN CHANGE FOR THE SAME RUNWAY WITH A CHANGE IN THRUST OR FLAP SETTING OR AN INTERSECTION TAKEOFF.** IN THE PERF SECTION/FAR PERF TAB PG 20.6, THE FORMULA FOR CALCULATION IS GIVEN – HEIGHT OF OBSTACLE PLUS 35 FT PLUS 0.008% X THE DISTANCE FROM THE POINT ON THE RWY WHERE THE A/C IS ASSUMED TO REACH 35FT AFTER AN ENGINE FAILURE AT V1. THE LIFTOFF POINT ON THE RWY WILL CHANGE WITH A DIFFERENT THRUST RATING, FLAP SETTING AND INTERSECTION TAKEOFF POINT.

B777 FLEET SUPPORT TEAM

**Note:** See Flight Ops Info Bulletin 97-03 Obstacle Clearance on SIDS

**MEL / CDL TAKEOFF PERFORMANCE CORRECTIONS:****OM1 Performance TPS 30.1 / 9-1-06****TPS Variations**

MEL CDL Takeoff Performance Corrections

TPS will automatically adjust the TPS takeoff data for MEL/CDL items entered by the Dispatcher. This is known as TPAS (Takeoff Performance Adjustment System). This only affects how the takeoff performance is computed. It does not change any other MEL/CDL procedures and does not involve MEL/CDL penalties for enroute or landing. If the Dispatcher enters an MEL/CDL item in TPS for the flight, it will:

- Automatically adjust the takeoff performance data for MEL/CDL items. All data (thrust, weights, speeds, & assumed temperature) for all runways on the TPS will be adjusted.

- Maximum Thrust is only required if the MEL/CDL item specifically states that Maximum Thrust is required. If this is the case, TPS will plan max thrust and indicate "MAX-PNLT" in the assumed temperature column. If maximum thrust is not required by the MEL/CDL item, but is needed to accommodate the planned

takeoff weight, it will show "MAX-WT" in the assumed temperature column.

- Use the normal Thrust Rating, Flap selection, and A/C On/Off logic.

- If more than one item is listed, all of the corrections are cumulative. A "D" suffix shown as the limiting condition on the MTOW indicates the dispatcher manually computed the maximum takeoff weight, and v-speeds are not adjusted. In this case. The flight crew must make any v-speed adjustments. For more information, see the next section titled Contaminated Runway and Manual Performance Adjustments.

**TAKEOFF & CLIMB:****CLOCK:**

*Technique: Set to run to monitor time airborne.*

**PREDICTIVE WINDSHEAR:**

Refer to QRH Maneuvers Windshear

*What happens in the airplane may not be what you expect – simulator training concentrates on the escape maneuver, but the PWS system gives a variety of different warnings.*

**OM1 Systems Warning Systems 85.2 / 11-1-07****OM2 Warning Systems 60.1-3 / 10-25-04****GPWS Windshear Alert and Predictive Windshear System****(PWS):**

Windshear alerts are enabled during takeoff, approach, and landing:

- GPWS provides an immediate windshear alert when an excessive downdraft or tailwind is occurring
- PWS provides windshear alerts when an excessive windshear condition is detected ahead of the airplane.

**PWS Alert System**

Weather radar uses radar imaging to detect disturbed air ahead of the airplane. PWS alerts are enabled approximately 12 seconds after weather radar begins scanning for windshear.

When PWS is scanning for windshear, radar antenna scan sweep is reduced.

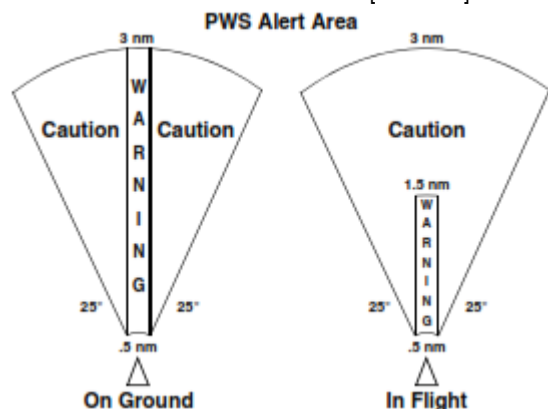
Prior to takeoff, PWS alerts can be enabled by pressing the WXR Switch on the EFIS control panel. On the ground with the WXR Switch pressed or not pressed, weather radar begins scanning for windshear when the thrust of either engine is in the takeoff range and thrust reversers are not unlocked or deployed.

In flight with the WXR Switch pressed or not pressed, weather radar begins scanning for windshear below 2300 feet radio altitude and PWS alerts are enabled below 1200 feet radio altitude.

When windshear is not predicted by PWS, weather radar returns are displayed only when the WXR Switch on the EFIS control panel is pressed.

#### NOTES:

- Weather radar provides windshear alerts for windshear events containing some level of moisture or particulate matter.
- Weather radar detects microbursts and other windshears with similar characteristics. Weather radar does not provide alerting for all types of windshear. The flight crew must continue to rely on traditional windshear avoidance methods. [see below]



#### QRH Maneuvers 1.35 / 2-2-11: Windshear / Microburst Alerts

**Caution!** AA policy as stated in Flight Manual Part I for low level windshear advisories is that takeoff is permitted, however caution should be exercised. Flights may not takeoff or conduct the final approach segment to a runway when ATC has reported a runway specific "Microburst Alert."

**Note:** If landing in an area of forecast windshear conditions, flaps 25 provides additional performance margin over flaps 30 in the event of an escape maneuver.

#### Windshear Warning

**Predictive windshear warning during takeoff roll**  
("WINDSHEAR AHEAD, WINDSHEAR AHEAD" aural):

- Prior to V1, reject takeoff.
- After V1, perform the Windshear Escape Maneuver.
- Windshear encountered during takeoff roll:
- If windshear is encountered prior to V1, there may not be sufficient runway remaining to stop if an RTO is initiated at V1. At VR, rotate at a normal rate toward a 15 degree pitch attitude. Once airborne, perform the Windshear Escape Maneuver.
- If windshear is encountered near the normal rotation speed and airspeed suddenly decreases, there may not be sufficient runway left to accelerate back to normal takeoff speed. If there

is insufficient runway left to stop, initiate a normal rotation at least 2000 feet before the end of the runway even if airspeed is low. Higher than normal attitudes may be required to lift off in the remaining runway. Ensure maximum thrust is set. Once airborne, perform the Windshear Escape Maneuver.

**Predictive windshear warning during approach**  
("GOAROUND, WINDSHEAR AHEAD" aural):

- Perform Windshear Escape Maneuver or, at pilot's discretion, perform a normal go-around.

**Windshear encountered in flight:**

- Perform the Windshear Escape Maneuver.

**Note:** The following are indications the airplane is in windshear:

- Windshear warning (two-tone siren followed by "WINDSHEAR, WINDSHEAR, WINDSHEAR") or
- Unacceptable flight path deviations.

**Note:** Unacceptable flight path deviations are recognized as uncontrolled changes from normal steady state flight conditions below 1000 feet AGL, in excess of any of the following:

- 15 knots indicated airspeed
- 500 fpm vertical speed
- 5 degrees pitch attitude
- 1 dot displacement from the glideslope
- Unusual throttle position for a significant period of time.

**Takeoff B777 PWS Alerts:** Downdraft / TW / LLWS

WX radar selected +12 sec startup

T/O: Wx radar selected or throttles advance

CAUTION Zone =  $\pm 25^\circ \times 3\text{nm}$

WARNING Zone = 3nm ahead @  $0^\circ$

#### "MONITOR RADAR DISPLAY"

Annunciation = LLWS  $<1200'$  RA / w/i 3nm T/O

Amber ND WSHR msg

[this is a Windshear Caution - maneuver to avoid]

+ND red LLWS symbol MAP/CTR/VOR/APP modes only

#### "WINDSHEAR AHEAD WINDSHEAR AHEAD"

Annunciation = LLWS  $<1200'$  RA on T/O

Red PFD/ND WINDSHEAR msg / MWrg /

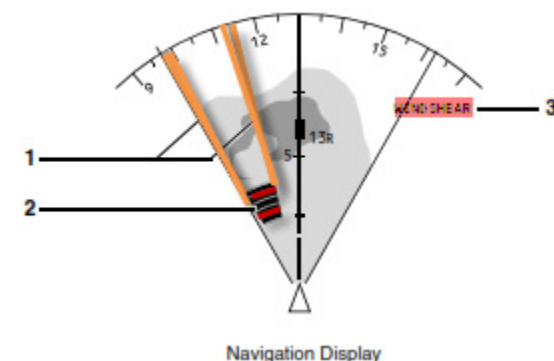
+ND red LLWS symbol MAP/CTR/VOR/APP modes only

**B777 GPWS Immediate LLWS Alert:**

"WINDSHEAR WINDSHEAR WINDSHEAR"

Annunciation = LLWS T/O rotation

Red PFD WINDSHEAR msg / MWrg



#### 1. PWS Radials

Displayed (Amber) –

- PWS alert is occurring.
- Extend from PWS symbol to help locate windshear event.

#### 2. PWS Symbol

Displayed (Red and Black) –

- PWS alert is occurring.
- Displays windshear location and approximate geometric size (width and depth).

Symbol, radials, and weather radar returns displayed automatically when:

- PWS alert occurs, and
- WXR is not selected on either ND, and
- Respective ND is in MAP, MAP CTR, VOR, or APP mode.

When terrain display is selected and PWS alert occurs, weather radar display replaces terrain display.

#### 3. WINDSHEAR Annunciation

**WINDSHEAR** (Amber) – PWS caution alert is occurring.

**WINDSHEAR** (Red) – PWS warning alert is occurring.

Displayed in all navigation display modes.

#### GPWS:

QRH Maneuvers Section

OM2 Systems Warning Systems 40.1-3 / 10-25-04

**"TERRAIN TERRAIN PULL UP"**

Red PULL UP message on both PFDs

Master WARNING Lights

Red TERRAIN message on both NDs

Solid red terrain on ND

20 to 30 seconds from projected impact with terrain

**"CAUTION TERRAIN"**

Amber TERRAIN message on both NDs

Solid amber terrain on ND

GND PROX Light

40 to 60 seconds from projected impact with terrain

OM2 WARNING SYSTEMS 10.13 / 10-25-04

Terrain Display

1. Terrain Display

Color and density vary based on terrain height versus airplane altitude:

- Dotted green: terrain from 2000 feet below to 500 feet (250 feet with gear down) below airplane altitude
- Dotted amber: terrain 500 feet (250 feet with gear down) below to 2000 feet above airplane altitude
- Dotted red: terrain more than 2000 feet above airplane altitude
- Dotted magenta: no terrain data available
- Solid amber: look-ahead terrain caution active
- Solid red: look-ahead terrain warning active.

#### NOTES

• In areas without terrain data, look-ahead terrain alerting and display functions not available. GPWS immediate alerts function normally.

• Terrain more than 2000 feet below airplane altitude or within 400 feet of nearest airport runway elevation is not displayed.

Displayed automatically when:

- A look-ahead terrain alert occurs, and
  - TERR not selected on either ND, and
  - Respective ND is in MAP, MAP CTR, VOR, or APP mode.hhh
- Display updates with a display sweep similar to weather radar display.

2. Terrain Mode Annunciation

TERR (Cyan) – Terrain display enabled.

3. TERRAIN Annunciation

TERRAIN (Amber) – Look-ahead terrain caution alert is occurring.

TERRAIN (Red) – Look-ahead terrain warning alert is occurring.

Displayed in all navigation display modes.

### **NOTE: See Attachment – LLWS & GPWS**

#### ACCELERATION HEIGHT:

Climb-Cruise-Descent 10.5 / 10-25-10

Acceleration Height - All Engines

Normal acceleration height is 1000 feet AGL. The altitude selected for acceleration and flap retraction may be specified for some airports.

The minimum altitude for flap retraction is 400 feet. (FAR).

#### ENGINE WARMUP:

FM1 10.6 / 3-2-09

Before Takeoff Engine Warm Up Requirements

Before takeoff, do not exceed power required for taxi for approximately:

- 3 minutes when engines are warm (engines were shut down for 1.5 hours or less).
- 5 minutes when the engines are cold (engines were shut down for more than 1.5 hours).

Engine oil temperature must be above the lower amber band before takeoff.

#### AT & FD:

OM1 20.5 / 10-25-10

Initiating Takeoff Roll

Autothrottle and flight director use is recommended for all takeoffs. However, do not follow F/D commands until after liftoff.

OM1 20.4 / 1025-10

Takeoff Roll Modes

After takeoff and climb is stabilized, select LNAV (if not armed before takeoff) after passing 400 feet AGL. If LNAV is armed for takeoff it engages above 50 feet AGL and within 2.5 nm of the active leg. If the departure procedure or route does not begin at the end of the runway, it may be necessary to use the HDG SEL mode at 400 feet AGL to intercept the desired track for LNAV capture. When the departure procedure is not a part of the active flight plan, use HDG SEL, TRK SEL or HDG HOLD mode. When an immediate turn after takeoff is necessary, the desired heading may be selected before takeoff.

Nav aids and appropriate radials or tracks required for use during the departure may be displayed on the navigation display using the FIX page feature and / or VOR / ADF Switches on the EFIS Control Panel. Use of the STA and WPT Switches on the EFIS Control Panel provides additional information on the navigation display.

#### PACKS OFF T/O:

OM1 Taxi-Takeoff 15.3 / 5-1-06

Before Takeoff: Pack Switches (both ) – OFF

Wait 30 seconds before setting takeoff thrust.

Allows packs to shutdown and EECs time to recompute maximum EPR line and reference / target EPR indications.

After Takeoff: Pack Switches (both) - AUTO

After engine thrust is reduced from takeoff to climb and prior to reaching 3000 feet above field elevation, position both Pack Switches to AUTO. When rate of climb falls below approximately 1000 fpm, the next higher climb rating should be selected.

#### TAKEOFF:

OM1 Taxi-Takeoff 20.1 / 5-1-06

At V1, the Captain will remove hand from the top of the throttles.

#### THROTTLE HOLD / EPR LAPSE:

OM1 Taxi-Takeoff 20.7 / 10-25-10

Initiating Takeoff Roll

The pilot-monitoring should verify that takeoff thrust has been set and the thrust lever HOLD mode is engaged.

#### NOTES

- Once HOLD annunciates, the A/T cannot change thrust lever position, but thrust levers can be positioned manually.
- Takeoff into headwind of 20 knots or greater may result in HOLD before the autothrottle can make final thrust adjustments.
- The EEC may adjust (reduce) target and actual EPR without Thrust lever movement during takeoff while the autothrottles are in the HOLD mode. Takeoff EPR lapses as a function of airspeed and altitude, and an EPR lapse of no greater than approximately 0.05 is considered normal.

The HOLD mode protects against thrust lever movement if a system fault occurs. Lack of the HOLD annunciation means the protective feature may not be active. If HOLD annunciation does not appear, no crew action is required unless a subsequent system fault causes unwanted thrust lever movement. As with any autothrottle malfunction, the autothrottles should then be disconnected and desired thrust set manually.

The HOLD mode remains engaged until VNAV engagement or another thrust mode is selected.

If full thrust is desired when HOLD mode is displayed, the thrust levers must be manually advanced.

After the airplane is in the air, pressing a TO/GA Switch advances the thrust to maximum available thrust and THR REF is annunciated.

#### NOTE

If TO / GA is selected when airborne, LNAV and VNAV disengage.

#### EXCEEDANCE DURING T/O:

OM1 Taxi-Takeoff 20.6 / 10-25-10

During takeoff, if an engine exceedance occurs after thrust is set and the decision is made to continue the takeoff, do not retard the thrust levers in an attempt to control the exceedance. Retarding the thrust levers after thrust is set invalidates takeoff performance. When the PF judges that altitude (minimum 400 feet AGL) and airspeed are acceptable, the thrust levers should be retarded until the exceedance is within limits and the appropriate Non-Normal checklist accomplished.

#### ROTATION & LIFTOFF:

OM1 Taxi-Takeoff 20.7 / 10-25-10

Above 80 knots, relax the forward control column pressure to the neutral position. Initiate a smooth continuous rotation at VR toward 15° of pitch attitude. The use of stabilizer trim during rotation is not recommended. After liftoff use the flight director as the primary pitch reference cross checking indicated airspeed and other flight instruments.

Rotate smoothly at an average pitch rate of 2 to 2.5 degrees / second. A 7 to 9 degree body attitude will be achieved in approximately 4 seconds.

**NOTE**

The flight director pitch command is not used for rotation.

**TAIL CLEARANCE:****OM1 Taxi-Takeoff 20-8 / 10-25-10**

Early or rapid rotation may cause aft fuselage contact with the runway. Late, slow, or under-rotation increases takeoff ground roll. Any improper rotation decreases initial climb flight path. Aft fuselage contact occurs at a pitch attitude of 12.1° with wheels on the runway and landing gear struts extended.

**NOTE**

Minimum clearance all TO flap settings.

Normal Tail Clearance = 37" at +8.5°

- 5K = 40"

-10K = 30" w struts compressed

**Tail Strike Detection System****OM1 20.8 / 4-17-07**

The tail strike alert system detects ground contact which could damage the airplane pressure hull. A two inch blade target and two proximity sensors are installed on the aft body of the airplane. The EICAS caution message TAIL STRIKE is displayed when a tail strike is detected.

**HEAVY WEIGHT TAKEOFF:**

*Technique: Consider requesting 260K for heavy weight T/O with a small margin between the 'foot' and 250K.*

AAPilots / Fleet / B777 / News / Overweight Landing vs. Fuel

Jettison 9/8/2008:

Boeing discusses landing the aircraft up to max operating weight. Generally, conditions permitting, you can land the aircraft on your takeoff runway. Takeoff Limited Landing Weight is also a consideration, and depending on conditions 620,000 pounds is a hip-pocket guide line – consult the landing charts ( In case of fuel dumping the aircraft will jettison 5400 PPM (~10,000# / 2 minutes) with center tank fuel or 3100 PPM with main tank only fuel. That would equate to roughly 6 minutes of dump from 648,000 to 620,000 pounds. Jettison standpipe 23,000 pounds.

**CLIMB:****OM1 Climb-Cruise-Descent 10.5 / 10-25-10****Acceleration Height - All Engines**

Normal acceleration height is 1000 feet AGL. The altitude selected for acceleration and flap retraction may be specified for some airports.

The minimum altitude for flap retraction is 400 feet. (FAR)

**Acceleration Height - Engine Out**

Engine out acceleration height will be as indicated on the TPS, entered in the CDU, and displayed on the PFD.

**Climb Thrust**

After climb thrust is set, the EECs automatically compensate for changes in environmental conditions during the climb and maintains climb thrust.

With the EECs in the ALTERNATE mode, thrust should be manually adjusted, as necessary, to ensure that the selected climb thrust is maintained.

**Derated Thrust for Climb**

Two climb derate options are offered in the Flight Management Computer

(FMC):

- CLB 1 – uses a constant 10% derate of maximum climb thrust to 10,000 feet, then increases thrust with altitude linearly to CLB Speed
- CLB 2 – uses a constant 20% derate of maximum climb thrust to 10,000 feet, then increases thrust linearly to maximum climb thrust at 12,000 feet.

When rate of climb falls below approximately 1000 fpm, the next higher climb rating should be selected.

Use of an assumed temperature reduced thrust takeoff or takeoff derate may affect automatic selection of climb derate. For a takeoff thrust reduction or derate of up to 5%, maximum climb thrust is automatically selected by the FMC. For a takeoff thrust reduction of more than 5%, there will be an automatic selection of derated climb. The purpose is to avoid power increase when leaving takeoff thrust.

On the ground the pilot may override the automatic derate selection after the takeoff selection has been completed. The automatic selection of CLB1 or CLB2 results in no thrust lever advance during the transition from takeoff to climb mode, and a good rate of climb performance.

**NOTE**

Derated takeoff and climb thrust both increase total trip fuel burn. The faster acceleration and climb gets the aircraft to cruise altitude quicker where the aircraft is more efficient. However, the increased maintenance cost, associated with the higher thrust, outweighs the increased fuel burn.

**Climb Speed**

The sooner the airplane can be accelerated to the climb speed schedule, the more time and fuel-efficient the flight.

**Cost Index Generated Climb / Cruise / Descent Speeds**

At times the flight planning system will generate very high Cost Indexes (CI)s to help keep a particular flight or the entire airline on schedule during certain periods of the year. When a high Cost Index is uplinked to the FMS, high ECON CLIMB / CRUISE / DESCENT speeds near VMO / MMO can result. Monitor carefully and when necessary adjust high CI generated speed schedules to prevent an overspeed event when flight conditions warrant.  
Economy Climb Schedule - FMC Data Unavailable.

**Climb Speeds**

Altitude	Speed
Below 10,000 ft	250 kts
Above 10,000 ft	310 kts / .84 m

**NOTE**

Maintain at least 15 knots above minimum maneuvering speed when climbing through FL200 to prevent the EICAS caution message AIRSPEED LOW from occurring.

**FLAP RETRACTION:****FM1 10.3 / 10-25-10****Flap Retraction Schedule**

The altitude selected for acceleration and flap retraction may be specified for each airport. Safety, obstruction clearance, airplane performance or noise abatement requirements are usually the determining factors.

During flap retraction, selection of the next flap position is initiated when reaching the maneuver speed for the existing flap position. Therefore, when the new flap position is selected, the airspeed is below the maneuver speed for that flap position. For this reason, the airspeed should be increasing when selecting the next flap position. During flap retraction, at least adequate maneuver capability or 30° of bank (15° angle of bank and 15° overshoot) is provided when the airplane has accelerated to the recommended maneuver speed for the selected flap position.

With airspeed increasing, flap retractions should be initiated when airspeed reaches the maneuver speed for the existing flap position. The maneuver speed for the existing flap position is indicated by the numbered flap maneuver speed bugs on the airspeed display.

For flaps up maneuvering, maintain at least:

- "UP"

**MAX ANGLE / MAX RATE CLIMB:****Climb-Cruise-Descent 10.6 / 10-25-10****Maximum Rate Climb**

Maximum rate climb provides both high climb rates and minimum time to cruise altitude. Maximum rate climb can be approximated

by using flaps up Maneuver Speed + 60 knots until intercepting Mach 0.82.

**NOTE:**

*The FMC does not provide maximum rate climb speeds.*

**Maximum Angle Climb**

The FMC provides maximum angle climb speeds. Maximum angle climb speed is normally used for obstacle clearance, minimum-crossing altitude, or to reach a specified altitude in a minimum distance. It varies with gross weight and provides approximately the same climb gradient as flaps up maneuvering speed.

**RADAR / TERRAIN:**

*Technique: PF Radar / PNF Terrain.*

**OVERWEIGHT LANDING & FUEL DUMPING:**

**FMI Sec. 19.1-7 / 3-15-11: Abnormal and Emergency**

**19.1.13 Overweight Landing and Fuel Dumping**

A. An overweight landing is defined as a landing made at a gross weight in excess of the maximum design (i.e. structural) landing weight for a particular model.

B. The maximum landing weight listed in the Aircraft Operating Manual Limitations Section is a structural weight limitation only and does not consider landing performance limits (climb and runway limit). *An overweight landing above the maximum design landing weight is considered a safe practice but landing at a weight that exceeds the performance limits of an aircraft compromises landing safety margins and may only be attempted in a critical emergency situation.*

C. A pilot may consider making an overweight landing when a situation arises that requires the airplane to return to the takeoff airport or divert to another airport soon after takeoff. Landing overweight and jettisoning fuel are both considered safe procedures. The 777 and some 767 airplanes have a fuel jettison system installed but are not required by the FAR for aircraft certification. Overweight landings are safe because of the conservatism required in the design of transport category airplanes by 14 CFR Part 25. FAR criteria require that landing gear design be based on:

- A sink rate of 10 feet per second (600 feet per minute) at the maximum design landing weight and,
- A sink rate of 6 feet per second (360 feet per minute) at the maximum design takeoff weight
- Typical sink rates at touchdown are 2 to 3 feet per second (120-180 feet per minute) and even a "hard" landing rarely exceeds 6 feet per second (360 feet per minute).

*Technique: Controlled power-on landing – do not reduce power to idle in the flare – the aircraft will stop flying and land.*

**NOTE**

There has been no adverse service experience with airplanes certificated under 14 CFR 25 involved in overweight landings. Furthermore, service experience indicates that damage due to an overweight landing is extremely rare. A normal touchdown of 200-300 feet per minute should impose no structural problems.

*D. In June 1972, the FAA issued Air Carrier Operations Bulletin Number 72-11 giving three examples of situations the FAA considered typical of those under which pilots may be expected to use their emergency authority in electing to land overweight:*

1. *Any malfunction that would render the airplane not airworthy.*
2. *Any condition or combination, thereof, mechanical or otherwise in which an expeditious landing would reduce the exposure to the potential of additional problems which would result in a derogation or compromise of safety.*
3. *Serious illness of crew or passenger which would require immediate medical attention.*

These examples are not limiting and do not cover all situations where any overweight landing would be considered appropriate.

*The captain will determine based on current circumstances which is the safest course of action.*

E. An overweight landing with an engine inoperative or a system failure may be more desirable than landing below maximum landing weight. Delaying the landing with a malfunctioning system or engine failure in order to reduce weight or jettison fuel may expose the airplane to additional system deterioration that can make the situation worse. The Captain is in the best position to assess all relevant factors and determine the best course of action.

F. If the Captain decides an overweight landing is a safe course of action:

1. **Declare an emergency.** An exercise of Captain's emergency authority requires that ATC be kept fully informed. (14 CFR 121.557)
2. Follow QRH Overweight Landing procedures.
3. **Notify Dispatch** as soon as possible.
4. **Make an E6 logbook entry** stating the aircraft's landing weight, estimated sink rate at touchdown, and any comments regarding the landing (e.g., hard, normal or soft). Normally a Phase I Overweight Landing Inspection will be completed by maintenance. Time required to complete the inspection is normally 30-45 minutes. The Phase I conditional inspection looks for obvious signs of structural distress, such as wrinkled skin, popped fasteners, or bent components in areas which are readily accessible.
5. An E6 logbook sign off must be completed by maintenance Prior to the next flight.
6. **The Captain must submit a P2** report stating that an overweight landing was made using the Captain's emergency authority.

**19.1.14 Fuel Jettison**

- A. Notify ATC when starting fuel jettison as soon as practical and again when fuel jettison is completed.
- B. Avoid fuel jettison at altitudes below 5000' AGL to minimize the adverse effects on humans, animals and vegetation.
- C. Avoid circling maneuvers while jettisoning fuel because a combustible area may be present for a period of time.
- D. There is no restriction on fuel jettison during an in-flight fire, whether inside or outside the airplane.
- E. The Captain must submit a P2 report stating starting time, location and altitude where fuel jettison took place along with the approximate amount of fuel jettisoned.

**REFER TO:**

**QRH NONNORMALS – 0 MISCELLANEOUS – 0.30**

**OVERWEIGHT LANDING / 11-1-09**

**0.32**

**Overweight Autoland**

Do not autoland if landing overweight. The autopilots are not certified for automatic landings above maximum landing weight. An automatic approach may be attempted, however the pilot should disengage the autopilot prior to flare height and accomplish a manual landing.

In an emergency, should the Captain determine that an overweight autoland is the safest course of action, the approach and landing should be closely monitored and the following factors considered:

- Touchdown may be beyond the normal touchdown zone; allow for additional landing distance.
- Touchdown at higher than normal sink rates may result in exceeding structural limits.
- Plan for a go-around or manual landing if autoland performance is unsatisfactory; automatic go-arounds can be initiated until just prior to touchdown, and can be continued even if the airplane touches down after initiation of the go-around.

**0.33**

**Overweight Landing**

Overweight landings may be safely accomplished by using normal landing procedures and techniques. There are no adverse handling characteristics associated with heavier than normal landing weight. Generally, landing distance will be less than takeoff distance for flaps 20, 25, or 30 landings at all gross weights. However, wet and contaminated field length requirements should be verified from the landing distance charts in Vol. I Performance chapter. Brake energy limits will not be exceeded under any normal or non-normal landing conditions.

If stopping distance is a concern, reduce the landing weight as much as possible. At the Captain's discretion, consider fuel jettison or reduce weight by holding at low altitude with a high drag configuration (gear down) to achieve maximum fuel burn-off.

Observe flap placard speeds during flap extension and on final approach. In the holding and approach patterns, maneuvers should be flown at the normal maneuver speeds. During flap extension, airspeed can be reduced by as much as 20 knots below normal maneuver speeds before extending to the next flap position. These lower speeds will result in larger margins to the flap placards, while still providing normal bank angle maneuvering capability, but will not allow for a 15° overshoot margin in all cases.

#### 0.34

Use the longest available runway, and consider wind and slope effects. Where possible avoid landing with tailwinds, on runways with negative slope, or on runways with less than normal braking conditions. Do not carry excess airspeed on final. This is especially important when landing during an engine inoperative or other non-normal condition. At weights above the maximum landing weight, the final approach maximum wind correction may be limited by the flap placards and load relief system.

Fly a normal profile. Ensure that a higher than normal rate of descent does not develop. If using the throttle manually, reduce to idle slowly after initiation of the flare. Do not hold the airplane off waiting for a smooth landing. Fly the airplane onto the runway at the normal touchdown point. If a long landing is likely to occur, go-around. After touchdown, immediately apply maximum reverse thrust using all of the available runway for stopping to minimize brake temperature. Do not attempt to make an early runway turnoff.

### ENROUTE:

#### DIVISION BRIEFINGS:

FO ATL IOE covers all divisions – no CKA will be scheduled. Review Division Briefing Guides for routes flown.

#### COCKPIT CREW:

##### FM1 17.7-1 / 3/15/11 CREW REQUIREMENTS

##### 17.7.1 Crew Certificate Requirements – Three or more Pilots

The acting pilot-in-command (PIC) during the Captain's rest break must hold an ATPC type rating for that aircraft, a current first class physical, and be equipment current and qualified.

##### 17.7.2 Pilots Age 60 or Older

Reference: 149 USC 44729; FAA InFO 08001; ICAO Annex 1, Para 2.1.10.1 and ICAO Annex 1, Amendment 167

Subject to the following limitations a pilot may serve in Part 121 operations until attaining 65 years of age. For purposes of age 60 and over requirements, a domestic operation is a flight between two domestic stations, which includes flights from the continental US to Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands, and Guam. All other scheduled operations are international.

#### A. Domestic Operations

Both the Captain and First Officer may be over age 60.

#### B. Two Pilot (Unaugmented) International Operations

One pilot under age 60 must be part of the crew for all two pilot (unaugmented) international operations.

#### C. Augmented International Operations

1. One pilot under age 60 must be part of the crew for all augmented international operations.

2. It is always acceptable for two pilots over age 60 to occupy The primary flight control positions when operating above 10,000 feet AGL.

3. For arrivals and departures at an international station FAA and ICAO recommend that during high workload phases of Flight (such as flight below 10,000 feet above ground level) at least one pilot seated at the controls (a crew duty position) should be less than 60 years of age. PICs should use careful crew management to ensure maximum compliance with this recommendation.

#### NOTE

#### Exceptions to this recommendation are authorized when:

- The Captain directs otherwise to ensure that a First Officer's recency of experience or landing currency is maintained.
- Required training, line check or qualification for Operational Experience is being conducted by a qualified Check Airman.

#### 17.7.3 Crew Duties

On flights with additional F/Os (FB and / or FC assigned), the F/O is second-in-command and acting PIC in the Captain's absence unless specified otherwise by the Captain. FB / FC duties are assigned by the Captain to include flying as relief pilot during Captain and F/O enroute rest breaks. The FB / FC may occupy either pilot seat when flying as relief pilot during rest breaks.

#### NOTE

If an abnormal, emergency, or non-routine situation arises the acting PIC will notify the Captain as soon as practical. The acting PIC is expected to exercise command judgment and take appropriate action(s) as dictated by the situation until the Captain arrives on the flight deck.

A. In the absence of the Captain from the flight deck, he or she will designate an acting PIC who will have the full authority of the Captain. Before being relieved for a rest break, the pilot-in-command shall designate the new PIC and brief the relief pilot/crew on the following as a minimum:

1. Diversion options to include alternate airports and weather, departure from track / airway procedures, ETPs, and terrain awareness areas.
2. Weather deviation options and procedures.
3. Current and "expect" clearances (e.g., re-release, step climbs, etc.).

4. Any other operational considerations (e.g., datalink clearances, required radio frequency or transponder code changes).
  5. Crew rest location(s) (bunk or rest seat) as applicable.
- B. At the discretion of the Captain, the FB or FC may takeoff or land from the right seat.

#### NAVCOM REQUIREMENTS:

FM2 Atlantic Europe Regional Procedures AA-6.4 / 31 Mar 06

#### 1.8 Enroute Navigation and/or Communication Equipment Failure

A. Prior to departure, the aircraft MEL specifies requirements for minimum aircraft navigational and communications equipment. In flight, minimum equipment required is specified by international agreements due to requirements of the airspace and AA Operations specifications.

B. In flight, in the Atlantic/Europe region, the following minimum NAV/COM equipment must be functioning prior to entering the related airspace:

##### 1. Communications -

- In areas outside of VHF communications coverage:

either two HF radios or one HF radio and SATCOM is required.

NOTE: VHF communications are available on special contingency routes over Iceland and Greenland as shown on Jeppesen Atlantic Orientation Chart AT (H/L) 1 & 2. No HF required.

##### 2. Navigation -

- MNPS airspace and non-MNPS airspace beyond the range of ground based NAVAIDs:

757/767 - Both FMC's and two IRSs

777 - One FMC and ADIRU

NOTE: Special contingency routes over Iceland and Greenland as shown on Jeppesen Atlantic Orientation chart AT (H/L) 1 & 2 only require one FMC and two IRSs plus ground based navigation for 757/767.

- Northern Canadian Area of Magnetic Unreliability (AMU):

767 - Both FMCs, both primary

777 - Dual FMCs and ADIRU

#### COMPANY POSITION REPORTS:

FMI SYSTEMS 65.7 / 5-1-07

##### Automatic Company Position Reports

When the route is uplinked to the FMC, waypoints on international flight plans at which AA Dispatch requires a position report are identified in DECS. Enroute, in oceanic and / or remote airspace, when the FMC sequences these selected waypoints, a position report is automatically sent to Dispatch for flight following. When a position report is sent, the FMC POS REPORT page displays "SENDING" then "SENT" at 6R. If the position report is sent automatically, do not send an FMC position report manually because these duplicate reports are also sent to selected Oceanic ATC centers.

If the route is manually loaded into the FMC (e.g., reroute), send for a wind request after the new route is executed. Updating the winds for the new waypoints also updates the automatic position report status for these waypoints and the crew need not send any position reports to Dispatch. If the winds are not updated, you must send position reports to Dispatch manually - this should be a rare occurrence.

When position reports are not sent automatically (e.g., when flying in domestic US airspace), you are required to send a company position report:

- At the first waypoint after reaching cruise altitude
- At least every 90 minutes enroute
- At the last waypoint prior to beginning of descent.

#### APU IN-FLIGHT START RELIABILITY PROGRAM:

##### OM1 SYSTEMS 45.2 / 10-25-10

##### APU In-Flight Start Reliability Program

The FAA requires that air carriers approved for ETOPS maintain an APU in-flight start reliability program. The purpose of this program is to make sure that the APU has the cold soaked start reliability necessary to prevent diversions and to supply electrical and pneumatic power if a diversion is necessary. The crew will be notified of the requirement to start the APU in-flight by a J8 or ACARS message.

In-flight starts made for this program should only be done on domestic or US mainland bound flights. The aircraft must be at cruise altitude above FL290 for at least 2 hours to assure APU cold soak conditions. If a start request is received on a trip leaving the US mainland, or with less than 2 hours of cruise time, it should be ignored.

The program allows up to 3 start attempts per flight. The first attempt should be made in the last hour of cruise and before top of descent. If the first attempt is unsuccessful, the second attempt should be made later in cruise or during initial descent. A third and final attempt may be made at a lower altitude, but not below FL290.

#### NOTE

APU start reliability can be improved by placing the APU Selector to ON for approximately 1 minute before selecting START. This permits all of the start logic to complete prior to APU starter engagement (e.g., for the APU air inlet door to sequence open). **Momentarily holding the selector in the START position also helps to ensure a successful start.**

#### START PROCEDURES

1. Start APU
2. Allow APU to run for 5 mins
3. Turn APU off
4. If start is successful send arms code 49990100
5. Make a numbered "info to maintenance" entry in the E6

logbook stating:

- Aircraft altitude
- Time in cruise
- Number of attempts
- APU start(s) was successful
- Use FMR code of 4999

#### FIRST START ATTEMPT IS UNSUCCESSFUL:

1. If APU FAULT light is illuminated, turn the APU Selector to OFF.
2. If the FAULT light remains illuminated, do not attempt additional starts.
3. If the FAULT light extinguishes, after the APU Selector is turned OFF, 2 additional start attempts should be made.
4. Do not exceed a total of 3 start attempts.
5. If any of the 3 start attempts are successful, follow successful start log procedures in steps 4 & 5 under "START PROCEDURES".

#### ALL 3 START ATTEMPTS WERE UNSUCCESSFUL:

1. Send ARMS code 49990200
2. Make a numbered E6 entry stating:
  - Aircraft altitude
  - Time in cruise
  - Number of attempts
  - If FAULT light remained illuminated
  - APU start attempt(s) was unsuccessful
  - Use FMR code of 4910

#### NOTES

- The APU in-flight start reliability program is for data gathering purposes only.
- Failure of the APU to start for the purpose of this in-flight start program does not require diversion to an alternate airport.

#### CRUISE CHECKLIST:

OM1 Climb Cruise Descent 15.1 / 11-1-07

CDU.....CHECKED

- Check NAV RAD page to ensure FMC is autotuning nav aids
- Obtain wind update (if required).

#### FUEL USAGE :

OM1 LIMITATIONS 10.19 / 3-2-09

Airplanes 7AA thru 7CA

- With no center tank fuel, use main tank-to-engine fuel feed with all operable main tank boost pumps on and the crossfeed valves closed.
- With center tank fuel available, center tank pump switches should be pushed ON before engine start. Use center tank fuel for all operations with all operable boost pumps on and the crossfeed valves closed until the FUEL LOW CENTER advisory message is displayed. Then continue flight using main tank-to-engine fuel

feed with all operable main tank boost pumps on and the crossfeed valves closed.

Airplanes 7CB and 7CC

• With center tank fuel equal to or less than 10,500 pounds, use main tank-to-engine fuel feed with all operable main tank boost pumps on and the crossfeed valves closed. Once in stabilized cruise and the FUEL IN CENTER message displays, the center tank pump switches should be pushed ON until the FUEL LOW CENTER advisory message is displayed. Then continue flight using main tank-to-engine fuel feed with all operable main tank boost pumps on and the crossfeed valves closed.

• With center tank fuel more than 10,500 pounds, the center tank switches should be pushed ON before engine start. Use center tank fuel for all operations with all operable boost pumps on and the crossfeed valves closed until the FUEL LOW CENTER advisory message is displayed. Then continue flight using main tank-to-engine fuel feed with all operable main tank boost pumps on and the crossfeed valves closed.

All Airplanes

- For minimum fuel operation, a crossfeed valve is opened.
- To correct fuel imbalance, open a crossfeed valve and turn off the Fuel Pump Switches for the fuel tank that has the lowest quantity.

#### COST INDEX VS MACH:

Fleet Manager Email 5-8-09

The info I sent yesterday about flying flight plan Mach/CI spurred the point from several that International Ops aren't included in DOT Rankings. This is true. DOT rankings are important for our airline. D+0/A+0/Block Time Performance is more important for our airline. It is as or more important for our premium international flights to arrive on time. Since Cost Index affects ECON, a comparison of FPR arrival time will be important. If the FPR shows you will be early then you can back the CI off, to save fuel.

A comparison against the Max Range Cruise chart in the Performance-Cruise Page 20.8 (0 CI) will give a good mach number to work the CI MACH toward while staying on time. Again adjusting Cost Index rather than flying a fixed MACH (except when Mach Number Technique is required) maintains a constant TAS at all altitudes.

Thanks,

Jim Dees

Capt Jim Dees, Fleet Captain B777

American Airlines, Inc.

817-967-5715-O / 817-939-4374-C

[jim.dees@aa.com](mailto:jim.dees@aa.com)

**CRUISE ALTITUDE:**

Technique: It may be advantageous to request an initial cruise altitude above optimum if altitude changes are difficult to obtain on specific routes. This minimizes the possibility of being held at a low altitude / high fuel consumption condition for long periods of time. However, flying at or near Optimum/Recommended Altitude will result in the greatest fuel savings. Flying well above Optimum will result in an increased fuel burn.

**OM1 Climb-Cruise Descent 15.1-7 / 10-25-10****Cruise Thrust Limit**

The FMC default thrust limit at cruise altitude is CLB (Climb) thrust. The CLB cruise thrust limit provides excess thrust to climb to an altitude using maximum climb thrust. For small speed excursions or maneuvering, maintain this default thrust value.

**Maximum Altitude**

Maximum altitude at which sufficient thrust is available to provide a minimum rate of climb of 300 fpm and which minimum maneuver margin exists prior to buffet onset.

**NOTE**

It is not necessary to introduce a "pad" below the FMC maximum operating altitude to preclude losing altitude in a turn. The 300 fpm all engine residual rate of climb is equivalent to approximately 21 degrees of bank angle capability when thrust limited.

In LNAV, airspeed and altitude are protected by the FMC limiting the bank angle in any turn executed. (There is no automatic protection if the turn is executed in a non-LNAV mode.) With CLB cruise thrust limit, the FMC will request up to MAX CLB thrust in order to maintain speed in the turn. This same maximum thrust is used to compute the limited bank angle in the turn at the target speed.

Bank angle limiting prevents the airplane from banking up to an angle where the thrust required is greater than the thrust available. This prevents the airplane from slowing down to a point such that there is not enough thrust available to regain speed, a state which eventually results in a need to descend. When LNAV bank angle limiting occurs, the aircraft flies outside the nominal turn path on a standard leg to leg transition at a waypoint. When it is predicted that this condition will occur, the FMC message LNAV BANK ANGLE LIMITED is annunciated to the flight crew prior to reaching the turn.

**Optimum Altitude**

Optimum cruise altitude is based on the selected cruise mode and flight plan distance. *For economy cruise, optimum altitude equates to the lowest economy Mach number.* Remember, FMC OPT ALT is based on zero wind. The flight plan considers

forecast winds, weather, flight time and route in obtaining an optimum altitude for the flight and is the preferred altitude to be flown.

**Altitude Selection**

Optimum altitude provides approximately a 1.5 load factor (approximately 48 degrees bank to buffet onset) or better buffet margin. The flight planning system uses FMC optimum altitude data and further refines it based on forecast winds, forecast temperature, flight time, and routing. Cruise altitudes should be flown as closely as possible to flight plan selected cruise altitudes. FMC altitude selection data (Optimum and Recommended) should be used to fine tune flight plan altitudes based on actual winds and temperatures.

*Flight plans not constrained by short trip distance are based on conducting the cruise portion of the flight within plus or minus 2000 feet of optimum altitude.* Since the optimum altitude increases as fuel is consumed during the flight, it is necessary to climb to a higher cruise altitude every few hours to achieve the flight plan fuel burn. *This is accomplished by initially climbing 2000 feet above optimum altitude and then cruising at that flight level until 2000 feet below optimum.* Flight plan selected altitudes are based on this data.

**Cruise Speed Determination**

Cruise speed is automatically computed by the FMC and displayed on the CRZ and PROGRESS pages. It is also displayed by the command air speed when VNAV is engaged. The default cruise speed mode is economy (ECON) cruise. The pilot can also select long range cruise (LRC), engine out modes, or overwrite fixed Mach or CAS values on the CRZ page target speed line.

ECON cruise is a variable speed schedule that is a function of gross weight, cruise altitude, cost index, and headwind or tailwind component. It is calculated to provide minimum operating cost for the entered cost index. *Entry of zero for cost index results in maximum range cruise. After level-off at the initial cruise altitude, adjust the FMC cost index on the PERF INIT page until the FMC ECON CRZ Mach is equal to the Flight Plan CRZ Mach.*

**Example**

The Flight Plan has an initial cruise altitude of FL320 and a CRZ Mach of 0.83. After level-off at FL320, with an FMC ECON CRZ Mach of 0.825, adjust the FMC Cost Index until the FMC ECON CRZ Mach is equal to 0.83. Unless assigned a constant Mach by ATC, fly using the adjusted cost index for the remainder of the flight as it will be 1 to 2% more fuel efficient than flying a constant Mach.

**Cruise Speed and Fuel Mileage**

How does cruise speed affect fuel mileage? Generally, as you fly faster, the increase in drag and fuel burn decreases the fuel

mileage. If you slow down, the fuel mileage increases. But as you slow down, there's a point where the fuel mileage peaks. Any slower speed decreases fuel mileage. To illustrate this, the graph on the next page shows fuel mileage versus cruise speed. This is based on a 777, at 480,000 lbs flying at 37,000 ft. The actual numbers will be different for other weights or altitude, but the general shape of the curve and the discussion is still applicable for other conditions.

The flyable speed range on this graph goes from the 1.3G Low Speed Buffet Margin up to MMO. We always want to keep at least a 1.3G margin above the Low Speed Buffet. And, we can't cruise any faster than MMO. In some cases the 1.3G margin to High Speed Buffet, or Max Cruise Thrust, may limit the fastest speed.

**Specific Range**

The upper solid line in the graph is fuel mileage shown as specific range (NM/1000 Lbs). The bottom scale is Cruise Speed in Mach. The scale on the left is NM/1000 Lbs.

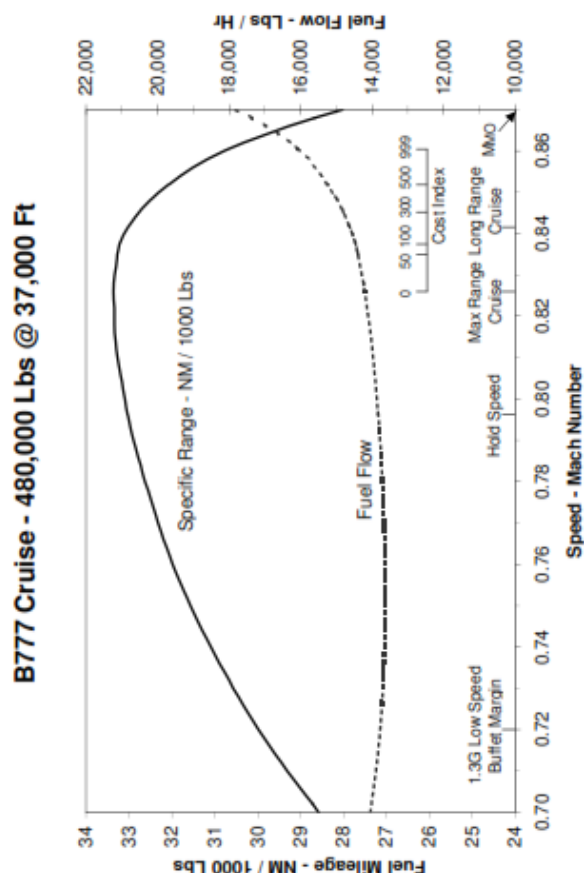
**Fuel Flow**

The fuel flow is shown as a dotted line. The scale on the right shows total fuel flow for both engines in Lbs/Hr.

**Maximum Range Cruise Speed**

Maximum Range Cruise Speed is the peak of the Specific Range curve. This is where you get the maximum possible fuel mileage. This particular curve peaks at Mach .826. As one goes faster, or slower, the Specific Range (Fuel Mileage) drops off. Notice that it drops off faster on the high speed side. And is much flatter on the low speed side.





#### Long Range Cruise Speed

Long Range Cruise Speed is faster than Max Range Cruise and is defined as the speed that gives 99 percent of the fuel mileage for Max Range Cruise. On the graph it's at Mach .841. Traditionally Long Range Cruise is used as an optimum cruise speed because it is significantly faster than Max Range Cruise, but only burns 1 percent more fuel and is generally where the fuel mileage starts its deep drop off on the high side.

#### Cost Index

With the advent of the FMS, more computing power was put in the cockpit which made a more precise calculation of optimum cruise speed possible. To do this, the concept of Cost Index was developed. Cost Index is simply all of the Time Related Costs (in \$/Hour) divided by the Fuel Cost (in ¢/Lb).

This graph has a scale showing the cruise speed obtained with various cost indexes under certain conditions. If the cost index is zero (meaning time related costs are negligible), the CI formula looks primarily at the cost of fuel and provides the best possible

fuel mileage (Maximum Range Cruise Speed). When the cost index is high (meaning time is costly compared to fuel) cruise speeds increase, increasing fuel burn but reducing "Total" cost. The total cost of time and fuel is minimized. Nominal Cost Index in normal circumstances is the lowest CI that should be flown.

Nominal Cost Index factors in time related costs such as maintenance cost, engine power by the hour charges, etc. Flight below this speed will increase the cost due to increased time related costs. In the case of AA's B777 the nominal cost index is roughly 30. This figure will vary based on fuel cost vs. time related cost but 30 has been determined to be a good average nominal cost index.

American Airlines' Flight Planning System adds another level of sophistication to determine optimum cruise speed by considering the scheduled flight time in the equation. This produces an even more precise optimum cruise speed than either Long Range Cruise or Econ Cruise with a Cost Index. Generally the Flight Plan will compute a cruise speed that arrives on time. If a flight arrives early, time related costs are usually not reduced significantly. Conversely if a flight arrives late, time related costs escalate exponentially. An on time arrival is the number one goal of every flight. Flights arriving late incur costs related to missed connections and lost revenue due to poor dependability. The cost of being late or increasing planned block time in most cases exceed other costs including additional fuel burn.

#### Optimum Cruise Speed

If conditions change little from the time the flight plan was generated until the time you takeoff, its best to follow the flight plan. The flight plan is computed to optimize speed, altitude and time related costs. If you takeoff early and are planned to land early, slow down and save fuel. How much fuel you save depends on your position on the curve. If the flight plan calls for Long Range Cruise (LRC), the greatest savings you can expect by reducing to Max Range Cruise (CI-0) is 1%. 1% fuel savings on a 15 hour flight can be a significant reduction. *If the planned speed is faster than LRC, you can save more by slowing down. Use the FMC ETA prediction and your Flight Progress Report (FPR) to determine an appropriate Cost Index that will allow you to arrive at the scheduled time (A-0). Make sure winds are updated first.*

#### NOTE

Never cruise slower than the Maximum Range Cruise (Cost Index Zero). A CI below "0" will burn additional fuel and add unnecessary costly minutes to the flight.

If you depart late, reasonable attempts should be made to arrive as close to scheduled arrival time (A-0) as possible. To make up time, increase climb, cruise and descent speeds. Use Cost Index to control speed. Insert a higher Cost Index and use ETA, fuel burn prediction and FPR to choose the appropriate Cost Index.

#### Step Climb

Flight plans not constrained by short trip distance are typically based on conducting the cruise portion of the flight close to optimum altitude. Since the optimum altitude increases as fuel is consumed during the flight, it is necessary to climb to a higher cruise altitude periodically to achieve the flight plan fuel burn. This technique is typically accomplished by entering an appropriate step climb value in the FMC according to the available cruise levels. For most flights, one or more step climbs may be required before reaching T/D.

It may be especially advantageous to request an initial cruise altitude above optimum if altitude changes are difficult to obtain on specific routes. This minimizes the possibility of being held at a low altitude / high fuel consumption condition for long periods of time. The requested / accepted initial cruise altitude should be compared to the FMS optimum and maximum altitude. Remember, a cruise thrust limited altitude is dependent upon the cruise level temperature. If the cruise level temperature increases above the chart value for gross weight, maximum cruise thrust will not maintain desired cruise speed.

Step altitudes can be planned at waypoints, or they can be optimum step points calculated by the FMC. Optimum step points are a function of the route length, flight conditions, speed mode, present airplane altitude, STEP TO altitude (or adjacent STEP TO altitudes) and gross weight. The FMC computed step point provides for minimum trip cost for the flight, including allowances for climb fuel. Initiate a climb to the new altitude as close as practicable to the step climb point.

#### NOTE

FMC default values for the step climb are not appropriate for Oceanic, RVSM or metric airspace. Manually enter the appropriate step climb values of Oceanic (1000'), RVSM (2000'), or ICAO metric (4000').

#### Fuel Penalties with Deviation from Optimum Altitude / Airspeed

Deviation	Cruise Fuel Penalty (increase in trip fuel)
ISA + 10°C	1%
2000 above optimum altitude	1-2%
Cruise speed m .01 above schedule	1-2%
4000 below optimum altitude	4-5%
8000 below optimum altitude	12-14%

#### Fuel Used for Enroute Climb

The additional fuel required for a 4000 foot enroute climb varies from 300 to 1000 pounds depending on the airplane gross weight, initial altitude, air temperature, and climb speed. The fuel increment is largest for high gross weights and low initial altitudes.

Additional fuel burn is offset by fuel savings in the descent. *It is usually beneficial to climb to a higher altitude if recommended by the FMC or the flight plan, provided the wind information is reliable.*

#### Minimum Drag Trim Technique

To trim the aircraft, set and maintain balanced thrust. Check fuel quantities for lateral balance.

#### Autopilot Engaged

With the autopilots engaged, stabilize the aircraft on a constant heading with HDG / TRK SEL or HDG / TRK HOLD. Trim the rudder in the direction of the down wing. Apply trim incrementally, allowing the bank to stabilize after each trim input. The aircraft is properly trimmed when the bank angle is zero. This should result in approximately neutral wheel. Proper aileron trim position will be held by the autopilot.

#### CAUTION

Do not use aileron trim with the autopilot engaged.

#### Autopilot Disengaged

With the autopilot disengaged, hold the wings level with the control wheel using the ADI for reference. Use rudder to correct any heading drift. When the heading is stable with the wings level, trim out any rudder pedal force using rudder trim. Trim out any control wheel forces using aileron trim.

#### OM2 Flight Management, Navigation 42.28 / 7-4-10

#### 4. Optimum Altitude, Maximum Altitude and Recommended Altitude (OPT MAX RECMD)

Blank when RTA is active.

#### OPT –

- With ECON speed selected, displays altitude which minimizes trip cost based on weight and cost index.
- With LRC, EO, CO, or SEL speed selected, displays altitude which minimizes trip fuel based on weight.
- Does not reflect the effect of speed if speed intervention (MCP IAS / MACH Window) is selected.

MAX – displays maximum sustainable altitude based on:

- Current gross weight
- Temperature
- Number of engines operating
- Cruise reference thrust limit CLB
- Speed (ECON, LRC, SEL, EO, or CO) option
- Residual rate of climb of 300 fpm
- Disregarding altitude or speed constraints
- Does not reflect the effect of speed if speed intervention (MCP IAS / MACH Window) is selected.

RECMD – Displays the most economical altitude to fly for the next 500 nm based on gross weight; selected cruise speed, including specified cruise speed segments; and constant altitude cruise over a fixed distance taking into account the route of flight, ntered winds, and temperature forecast. The FMC evaluates altitudes up to 9000 feet below the current CRZ ALT and up to less than MAX altitude. Recommended altitudes are selected consistent with the step climb schedule and specified step size. If a step size of zero has been selected, the recommended cruise level is selected assuming a 2000 foot step size. The recommended altitude is set to the CRZ ALT when within 500 nm of the T/D.

#### NOTE

The recommended altitude may be above or below cruise altitude. Refer to RTE DATA and WIND pages for wind and temperature data.

For RTA CRZ mode active: OPT, MAX, and RECMD are not computed. OPT, MAX, and RECMD headers are blank.

#### 5. STEP SIZE

Used for calculation of optimum step point and step climb predictions.

(Before AIMS V14 Upgrade)

Displays the default step climb size of ICAO.

Valid entries are altitudes from 0 to 9000 in 1000 foot increments.

Deletion of a manual entry defaults back to ICAO.

(After AIMS V14 Upgrade)

Displays default step climb size: RVSM, ICAO, or 0 as selected in AMI.

Valid entries are:

- “0” to inhibit predicted step climbs, or
- altitudes from 1000 to 9900 in 100 foot increments, or
- “I” for ICAO, or
- “R” for RVSM

Deletion of a manual entry returns step size to the default value.

#### STEP CLIMB:

#### OM2 Flight Management, Navigation 42.25-27 / 10-25-04 Planned Step Climb

When a step climb is planned to start at a waypoint, the data can be entered on the RTE LEGS page. The FMC performance predictions assume the airplane will start the climb at the identified waypoint. The FMC displays the distance and ETA to the step point on the PROGRESS page. The corresponding altitude profile point and identifier is shown on the ND.

#### 1. Step Climb Altitude

Enter the cruise altitude as an altitude constraint and the letter S. The FMC assumes the step climb starts at the waypoint.

Accomplish the step climb at the waypoint with the steps described in cruise climb.

#### Calculated Step Climb 7-14-10

When a non-zero value is entered into the STEP SIZE line on the PERF INIT or CRZ page, the FMC calculates optimum points for step climbs as the airplane performance permits. The climb altitude is determined by the value in STEP SIZE. Multiple step climbs are possible based on performance and route length. VNAV commands the step climbs, if the MCP altitude and the FMC CRZ ALT is set to the new altitude.

The FMC calculates step climb points as a function of lateral flight plan, speed mode, present and step to altitude, and gross weight. The gross weight for a step from present CRZ ALT to STEP TO altitude is the gross weight at which the optimum altitude is halfway between the two altitudes.

#### 1. TO STEP CLIMB 7-14-10

When the cruise climb start point is the next VNAV event, the line title changes to TO STEP CLIMB.

Displays the ETA and DTG to the point where the step climb starts.

If the airplane passes the step climb point and has not started to climb, the ETA and DTG are replaced with the word NOW.

When the FMC calculates that a step climb is not advised, the ETA and DTG are replaced with the word NONE.

#### 2. STEP TO

An altitude can be entered for a step climb evaluation. The FMC calculates the predicted step climb data and displays the results on this page and the PROGRESS page.

*Entering a zero value for STEP SIZE causes the FMC to calculate performance based on a constant altitude flight at the CRZ ALT. Entering a valid, non-zero increment or ICAO step size causes the FMC to calculate performance based on accomplishing step climbs at calculated step climb points. Step climb altitudes entered on the RTE LEGS page can be higher or lower than the CRZ ALT. These step climb altitudes cannot be overwritten on the CRZ page.*

*When using the ICAO step size, the STEP TO altitude is the next higher altitude above the OPT altitude corresponding to the direction of flight, based on the CRZ ALT entered before takeoff. Changes to CRZ ALT while in flight do not affect calculation of STEP TO altitudes using ICAO step sizes. However, if an alternate route (for example, Route 2) is activated in flight, the hemispheric altitude will be calculated using the current CRZ ALT. When using an altitude increment step size, the STEP TO altitude is the next higher altitude above OPT calculated by adding the STEP SIZE increment to the FMC CRZ ALT.*

When entering a cruise altitude above maximum altitude, the scratchpad message MAX ALT FLXXX displays.

*Entry of a new cruise altitude deletes all waypoint altitude constraints at or above the new cruise altitude.*

Displays:

- The STEP TO altitude from the RTE LEGS page
- A calculated step climb altitude based on the step size. Manual entry is allowed.

Blank when:

- There is no active flight plan, or
- Within 200 nm of the T/D point, or
- Within 500 nm of the destination, or
- In the EO D/D phase.

### 3. AT 7-14-10

Displays the ETA and DTG to the step climb point where a climb to the STEP TO altitude minimizes trip cost (ECON CRZ) or fuel other CRZ speed).

Displays NOW passing the step climb point.

Line title changes to AVAIL AT when the climb is restricted by thrust or buffet.

Line title changes to TO T/D when within 200 nm of the top of descent point or within 500 nm of the destination. ETA and DTG are relative to the T/D point.

The data is the same as displayed on the PROGRESS page.

### FMC ALTERNATE AIRPORT PAGES:

#### OM2 FLIGHT MANAGEMENT, NAVIGATION 43.21 / 3-25-08

Alternate Airport Diversions

ALTN page 1/2 data aids the flight crew in finding a suitable alternate airport. The page displays four airports in an ETA sequence. Each airport on the list has an XXXX ALTN page with more data. Select the XXXX ALTN page with a caret. ALTN LIST page 2/2 may contain a list of uplinked alternate airports. Three alternate airport uplinks can be received. ALTN LIST page 1/2 can get an uplink for the entire page or for just the ALTN INHIB line. ALTN LIST page 2/2 can receive an uplink of alternate airport names.

Alternate Page 1/2: The first alternate page displays alternate airport data. An alternate airport can be selected to change the flight plan destination. The source of alternate airports can be:

- An uplink directly to this page
- Automatic selection from the ALTN LIST page
- Automatic selection from the navigation database
- Manual entry.

Alternate airports automatically selected from the alternate list or the navigation database displayed in small font. All four alternates display on the ND in cyan. The alternate airport symbols display when the ND is in the plan mode. The selected alternate airport

displays at all times on the ND map. Other alternates display on the ND map display when the ARPT Switch is on.

43.23 / 9-16-08

#### 1. Alternate Airports

Displays the identifier of the four alternate airports in ETA order when airborne; and, in distance order when on the ground. Valid manual entry is an airport from the navigation database. A manual entry into a field displaying a small font value overwrites the small font value, but does not delete it from the Alternates Candidates list. After predictions are complete, the overwritten small font value is placed on the list according to ETA order. A manual entry into a field displaying a large font value overwrites the large font value. Manual entries display in large font. The DELETE Function Key can be used to remove manually entered alternate airports from the ALTN page.

#### 2. Alternate Request (ALTN REQUEST)

Press – Transmits a data link request for a preferred list of alternates (up to four). Uplinked airports are displayed in ETA order but are assigned a preference number by the transmitting site. The scratchpad displays the message ALTN UPLINK when the alternate airport data arrives.

#### 3. Weather Request (WXR REQUEST)

Press – Transmits a data link request for alternate airport weather data. Uplinked weather is sent to the flight deck printer.

#### 4. ETA

ETA is calculated based on the routing, altitude, and speed displayed on the XXXX ALTN page. Displays the alternate airport ETA. Blank when airplane is on the ground.

#### 5. FUEL

Predicted arrival fuel is calculated based on the routing, altitude, and speed displayed on the XXXX ALTN page. The message UNABLE FUEL displays in the FUEL column if the predicted arrival fuel is less than zero. Fuel values are blank when the airplane is on the ground. Displays the alternate airport predicted arrival fuel.

43.24 / 9/16/08

#### 6. Selected (<SEL>)

The selected alternate is identified with an <A> or <SEL> to the right of the airport identifier. Usually, the closest alternate is automatically selected and identified with <A>. Manually selecting an alternate places <SEL> to the right of the airport identifier. The selected alternate identifier displays in the line title of the DIVERT NOW prompt. The FMC selects the alternate airport with the earliest ETA. FMC selected alternates display <A> to the right of the airport identifier. Entering a new airport into the list of four does not select the new airport. Use the DELETE Function Key on a manually selected alternate to remove <SEL>. The automatic selection function selects a new alternate.

#### 7. Alternate Select

Press – Displays the XXXX ALTN page for the alternate airport adjacent to the > prompt.

#### 8. Alternate Inhibit (ALTN INHIBIT)

An airport will not be one of the four alternate airports if entered into the alternate inhibit line. One or two airports can be entered. Alternate inhibits can be manually entered or uplinked. The inhibited airports may be uplinked with the ALTN UPLINK or separately. If uplinked separately, the scratchpad displays the message ALTN INHIBIT UPLINK. Valid entries are airports from the navigation database.

43.25 / 10/25/04

#### 9. DIVERT NOW

Selecting DIVERT NOW displays the route from the present position to the selected alternate using the route displayed on the XXXX ALTN page for the diversion airport. The details of the route can be confirmed or modified before the diversion is executed. Execution of the diversion:

- Changes the route destination airport.
- Includes the route modification into the active flight plan.
- Deletes all parts of the original route that are not part of the diversion.

• If a descent path exists, deletes all descent constraints (the scratchpad message DESCENT PATH DELETED displays when DIVERT NOW is selected). After a divert is executed the XXXX ALTN page is not updated until all CDUs are selected off of the XXXX ALTN page.

Press –

- Makes an LNAV route modification for a divert to the selected alternate.
- Displays the MOD XXXX ALTN page for the selected alternate.
- Displays SELECTED in this position on the CDUs not involved with the modification.
- Blank on ground.
- Blank in the air when a diversion is not permitted.

43.26 / 10-25-04

Alternate List Page 2/2

The second alternate page displays a list of previously uplinked alternate airports. The alternates on the ALTN page 1/2 are selected from this list or from the navigation database when a list does not exist.

#### 1. Alternate Airports List

These four lines contain up to 20 airports from which alternates can be uplinked airports do not use all four lines. The list is uplinked directly to this page. No manual entry is allowed. Manual airport entries are accomplished on the ALTN page 1/2.

#### 2. Alternate List Request (ALTN LIST REQUEST)

Press – Transmits a data link request for an alternate airport list uplink.

## 3. INDEX

Press – Displays the INIT / REF INDEX page.

## 4. Alternate List Purge / Confirm (ALTN LIST PURGE / CONFIRM)

When no list exists, alternate airports can be selected from the navigation database. Selecting the PURGE prompt arms the purge function and displays a CONFIRM prompt before the list is deleted.

Press – Deletes all airports from the list. A new list must be uplinked after a purge.

43.27 / 10-25-04

XXXX Alternate Page

Each of the four alternate airports displayed on the ALTN page 1/2 has a related XXXX ALTN page. The XXXX ALTN pages display specific data about alternate airports, the route used for a diversion, and the conditions upon which the ETA and fuel calculations are based. All data on the page is related to the alternate airport displayed in the page title. Three routes options to the airport can be selected:

• DIRECT TO – Direct to alternate

• OFFSET – Flight plan route with an offset

• OVERHEAD – Flight plan route to a waypoint, then direct to alternate. The selected route option has an effect on ETA and fuel remaining. It is identified by <SEL>. Selection of a route option for one alternate selects the same route option for the other three alternates.

43.28 / 9-16-08

## 1. VIA DIRECT TO

Press – Selects DIRECT TO route option. All flight plan waypoints are deleted.

## 2. VIA OFFSET

Press –

• With scratchpad empty, selects OFFSET route option.

• With offset data in scratchpad, enters offset data. Does not select offset option. Entry and exit to the offset is the same as for the RTE page offset. Flight plan waypoints are retained.

43.29 / 9-16-08

## 3. VIA OVERHEAD

Press –

• With scratchpad empty, selects OVERHEAD option.

• With overhead data in scratchpad, enters overhead data. Does not select overhead route option. Displays active waypoint in flight plan. The waypoints up to the selected or entered overhead waypoint are retained, then routing is direct to the alternate airport. All waypoints after overhead waypoint are deleted. Enter any waypoint in the active or modified route.

## 4. Engine Out (ENG OUT)

This prompt performs the same function as described on the cruise page in the FMC Cruise section. It can be selected before or after the diversion is selected.

## 5. Alternate (ALTN)

Press – Displays the ALTN 1/2 page.

## 6. Altitude (ALT)

Entry of any valid altitude or flight level into this line causes a recomputation of ETA and arrival fuel. Altitude entries do not become part of the diversion modification. Altitude entries apply to all four alternates. Displays the altitude for which ETA and arrival fuel are calculated. The scratchpad message UNABLE ALT displays if the entry is above maximum altitude or the top of climb point for divert is after top of descent point for divert.

## 7. Speed (SPD)

Entry of speed or Mach number into this line causes a recomputation of ETA and arrival fuel. Speed entries do not become part of the diversion modification. Speed entries apply to all four alternates.

Speed modes available are:

• ECON (economy)

• LRC (long range cruise)

• EO (engine out)

• EO LRC (engine out long range cruise)

• CO (company speed)

• Any CAS or Mach.

43.30 / 9-16-08

## 8. WIND

Entry of data causes recomputation of ETA and arrival fuel. A wind entry can be made for each of the four alternates. A wind entry applies to only one alternate. Valid entry is a direction in degrees / speed in knots from 1 to 250.

## 9. Altitude / Outside Air Temperature (ALT / OAT)

Entry of data into these lines causes a recomputation of ETA and arrival fuel. A separate ALT / OAT entry may be made for each of the four alternates. Displays the OAT for a specific altitude.

Valid entry is an altitude / temperature in degrees C.

## 10. Alternate Airport ETA / Fuel (XXXX ETA / FUEL)

Displays calculated airport ETA and arrival fuel based on the selected route, altitude, and speed displayed on this page.

## 11. XXXX DIVERT NOW

This prompt performs the same function as described on the ALTN 1/2 page. NOTE After a divert is executed, the XXXX ALTN page data is not updated until all CDUs change to a page other than the XXXX ALTN page.

## ETOPS ALTERNATES:

FMI 17.3.6 / 3-15-1117.3.12 ETOPS Suitable Enroute Alternates

Reference: 14 CFR 121.617, 121.623, 121.624, & 121.625; Ops Specs B055, B042, C055

C. The forecast weather minimum requirements for enroute alternates are the same as for destination alternates (refer to Destination Alternate Weather Requirements in chapter 6) except that for enroute alternates, the forecast weather minimums must exist from the earliest to the latest possible landing time.

D. Approximately one hour prior to the oceanic entry point, the Captain will review all potential enroute diversion airports along the route of flight using the most recent weather reports available.

E. In the event of a significant ATC reroute the Captain will contact dispatch to obtain a new flight plan, enroute alternates, and ETPs.

F. Weather and NOTAMs at the designated enroute alternate airports are monitored during flight by dispatch and significant adverse changes will be reported to the flight crew. Enroute alternate airports may be changed by agreement between the Dispatcher and Captain while enroute if necessary.

G. Before proceeding beyond the ETOPS entry point, if any conditions are identified at a filed alternate airport (such as weather forecast below landing minima) which would preclude a safe approach and landing, the Dispatcher and the Captain will designate another alternate airport.

H. If an actual emergency requires a landing at the nearest suitable airport, a different airport than the flight planned enroute alternate may be closer or more suitable and may be used for diversion after considering the airport facilities, NAVAIDs, weather conditions, NOTAMs, and nature of the emergency.

OCEANIC CLEARANCES:If Oceanic Clearance Not Received by Entry Point:

Flight may enter NAT OCAs while waiting for delayed clearance, except for Shanwick.

You must hold outside NATS airspace! DO NOT hold at entry point unless directed to by ATC.

Reference: NATL. Orientation Chart.

Technique: Use and follow the checklist on the appropriate Division Reference Guide.

FMI 17.5-4 / 3-15-1117.5.7 North Atlantic Oceanic ATC Clearances

A. ACARS procedures for North Atlantic oceanic clearances are located in the Operating Manual or Flight Manual Part II, AA Operational Information Section. Procedural updates may be located as a special message on the flight plan or NOTAM.

B. If three or more crewmembers are in the cockpit, the North Atlantic oceanic clearance will be monitored by two crewmembers and crosschecked to ensure that it has been copied correctly and

### Westbound Shanwick Datalink Oceanic Clearance

### Clearance Request / Receipt

Datalink request for oceanic clearance must be made not more than 90 minutes and not later than 30 minutes prior to the Sharwick FIR.

### NOTE

Enter the clearance request information on the COMPANY (ACARS) FREE TEXT page as follows:

- ADDRESS – Leave blank.
- The following data is entered on the first line with a slash ( / ) between each item and no spaces:
  - Facility (S for Shanwick, the oceanic clearance facility that the request is being directed to)
  - Entry point (requires a name or a 7 digit LAT / LONG. For LAT / LONG, enter a two digit latitude followed by N and a three digit longitude followed by W; e.g., 55N010W)
  - ETA for entry point (four-digit UTC numeric entry; e.g., 1359)
  - Mach (two-digit numeric entry **without** decimal point; e.g., 84)
  - Flight level (two-digit numeric entry **without** ending zero; e.g., 36 for FL360).
- Subsequent lines – Any additional or supplemental information, such as indicating an acceptable alternate flight level or track.

**NOTE**

- Latitude is a two digit, not a three digit, entry followed by a N (58N not 058N).
- Longitude is a three digit, not a two digit, entry followed by a W (010W not 10W).

ATC		FLIGHT INFORMATION		COMPANY	
REVIEW		MANAGER		NEW MESSAGES	
1255z		FREE TEXT			
		ADDRESS: <input type="text" value="-----"/>		AA	
TEXT:		<input type="text" value="S/55N010W/1359/84/36"/>			
		<input type="text" value="ABLE FL370"/>			
		<input type="text" value=""/>			
<input type="button" value="SEND"/>		<input type="button" value="PRINT"/>		<input type="button" value="RESET"/>	
				<input type="button" value="RETURN"/>	
				<input type="button" value="EXIT"/>	

After the oceanic clearance request is sent and prior to receiving the clearance, two messages will be sent to the printer.

- First message – Sent by American Airlines to inform you that the request was forwarded to Sharwick.

### Example

Example  
 .TULDDAA 181248 FROM  
 AGM  
 AN N777AN  
 - AA0037-55N010W/1359 M084F360  
 ABLE FL370  
 >  
 SENT TO SHANWICK ATC

- Second message – Sent by Shanwick to inform you the request was received.

### Example

.PIKCLYA 181248  
AGM  
AN N777AN/FI AA37/MA 428A  
- FSM 1248 010118 EGGX  
AAL37 RCL RECEIVED  
IF NO CLEARANCE WITHIN 15 MINUTES - REVERT TO  
VOICE PROCEDURES  
END OF MESSAGE

**NOTE**

If the clearance request is not acknowledged ("RCL RECEIVED") within 5 minutes, one more downlink request may be made not later than 30 minutes prior to the Shanwick FIR. If this request also fails to receive an acknowledgement, revert to voice procedures.

When the clearance is received, the flight crew is notified by a •COMM alert (no high-low chime). If the Communications Main Menu page is not displayed, press the COMM Display Switch.

The oceanic clearance will display automatically without any other actions.

ATC	FLIGHT INFORMATION	COMPANY
REVIEW	MANAGER	NEW MESSAGES
1254Z	OCEANIC CLEARANCE	
1254 010118 EGGX CLRNC 2437 AAL37 CLRD TO KDFW VIA 55N010W NAT BRAVO 55/10 56/20 57/30 57/40 56/50 SCROD VALIE FM 55N010W/1359 MNTN F360 M084 END OF MESSAGE		
ACCEPT	PRINT	REJECT

**After the clearance is reviewed:**

PRINT ..... SELECT

ACPT Switch \_\_\_\_\_ PRESS

- Use the DataLink ACPT Switch on the glareshield panel.
- Receiving the clearance tells Shanwick that the clearance was accepted. You **must** accept the clearance, even if the clearance is not desirable, within 20 minutes of the time it was received or it becomes void.
- After accepting the clearance, a confirmation message from Shanwick will be sent to the printer. The oceanic clearance is now in effect.

### Example

.PIKCLYA 181255  
AGM  
AN N777AN/FI AA37/MA 441A  
- FSM 1255 010118 EGGX  
AAL37 CLA RECEIVED  
CLEARANCE CONFIRMED  
END OF MESSAGE

**NOTE**

A confirmation message **must** be received from Shanwick for the oceanic clearance to be in effect.



■ If the clearance is unacceptable:

- Downlink another oceanic clearance request via the COMPANY (ACARS) FREE TEXT page with the reason for new request, or
- Contact Shanwick by voice.

■ If you will not make your anticipated ETA for the entry fix or to correct any error in the initial request:

- Immediately advise ATC.
- Make another oceanic clearance request via the COMPANY (ACARS) FREE TEXT Page with the reason for new request, or
- Contact Shanwick via voice.
- A re-clearance will be sent by Shanwick via datalink. Use the same procedures as before to accept the reclearance.

**Time-Out Message**

If an oceanic clearance is not received in a timely manner, a time-out message will be sent to the printer. Contact Shanwick via voice.

*Example*  
 .PIKCLYA 181318  
 AGM  
 AN N777AN/FI AA37/MA 428A  
 - FSM 1318 010118 EGGX  
 AAL37 TRANSACTION TIMEOUT  
 REVERT TO VOICE PROCEDURES  
 END OF MESSAGE

**Review / Print-Out of Oceanic Clearance**

The oceanic clearance may be reviewed or printed by selecting REVIEW from the communications main menu and then selecting RECEIVED. From the review list, select the desired message for review or PRINT as desired.

**Eastbound Gander Datalink Oceanic Clearance**

The Eastbound Gander Datalink Oceanic Clearance procedures are the same as Westbound Shanwick Datalink Oceanic Clearance procedures except for:

- The request should be made between 90 minutes and 60 minutes prior to the oceanic entry point.
- In the free text message for the oceanic clearance request, use the letter G for the facility.

**MACH NUMBER:**

FM1 Sec 17 p.31 / 4-10-08

**8.8 Mach Number Technique**

Maintain mach assigned by ATS. Changes must be approved.

Mach number technique areas:

1. Canadian oceanic / domestic airspace.
2. NATL MNPS and airspace.
3. Specified routes U.S. east coast to Bermuda or San Juan, or transiting New York, Miami, and San Juan.
4. NOPAC and PACOTS
5. Leaving oceanic airspace maintain assigned mach number in domestic controlled airspace unless ATS authorizes a change.

**ACARS REROUTE UPLINKS:**

*Note: Follow the Enroute Reference Guide checklist and crosschecks. ACARS FP printout will be compressed and heading/distance will be compressed into different columns, but are present.*

EXAMPLE: For circle and tick procedures, the **MH** will be located on the **first line**, and the **Segment Distance** will be located on the **second line**:

<b>BEDRA</b>	<del>0016</del>	N49000	W015000	<b>278</b>	840	477	PO5
<b>0128</b>	0016	0042					
BEDRA	36	34036	M010	284	000	487	0
2547	0122	297					

<b>N48W020</b>	<del>0026</del>	N48000	W020000	<b>265</b>	840	484	PO5
<b>0208</b>	0026	0066					
4820N	36	35011	M004	268	000	488	0
2339	0148	0363					

**NAV ERRORS AND CONTINGENCIES:**

**FMI 17.5-6 / 3-15-11**

**17.5.9 NAV Error and Responsibility**

**A. Most navigation errors are caused by human error rather than equipment failure.** Compliance with published procedures in all geographic areas is essential to safe long range navigation. It is the Captain's responsibility to ensure that proper navigation procedures are followed.

**B.** Do not modify the active route by the addition or deletion of waypoints (i.e., ETP(s), midPoints, 10 minute / 2 degree checks, etc.) unless cleared accordingly. Addition or deletion of waypoints will interrupt the CDU / MCDU sequence. Deletion of waypoints can result in an off course track.

**17.5.10 Class II Airspace Navigation Accuracy Checks**

**Reference: Ops Spec B036 and B054**

**A.** Operations Specification B036 (Class II Navigation Using Multiple Long-Range Navigation Systems) and B054 (Class II Navigation Using Single LRNS) both require the following:

*Prior to entering any airspace requiring the use of a long-range navigation system, the aircraft position shall be accurately fixed using airway navigation facilities or ATC radar. After exiting this airspace, the aircraft position shall be accurately fixed and the long range navigation system error shall be determined and logged in accordance with the operator's approved procedures.*

**OM1 Systems/FMS Navigation 65.12 / 10-25-10**

**Navigation Accuracy Check (NAC)**

The following check must be performed prior to entering and exiting Class II airspace:

On the FMC, POS REF page 2 or PROGRESS page 4, ensure the ANP is less than or equal to the RNP.

**NOTES**

- Refer to Vol II – FMC – Navigation Performance.
- The AIREP Form should be annotated to confirm successful accomplishment of the NAC.

- A "NAV UNABLE RNP" EICAS message will be displayed if ANP is greater than RNP.

**B.** Refer to the FMS references in the Systems Section of the Operating Manual or the appropriate FMS page or displays to accomplish the navigation system accuracy check.

**C.** Accomplishing a satisfactory position report with ATC while in radar contact also satisfies the navigation accuracy check requirement.

**17.5.11 Gross Navigation or Altitude Error Reporting**

**A.** If a flight is observed by ATC or otherwise determined to be 25 NM or more off its cleared track when within North Atlantic MNPS airspace, ICAO rules require that ATC initiate a "Gross Navigation Error Report."

**B.** When operating in RVSM airspace, if a flight is observed by radar or otherwise determined to be 300 feet or more off its cleared altitude, ICAO rules require that ATC initiate a "Gross Altitude Error Report."

**C.** ATC will advise the flight that a gross error report is to be made. The pilot will be asked for comments concerning the situation. ATC will include these comments in the report. The Captain, AA, and the FAA will be required to respond to this report.

**D.** The Captain will:

1. Notify dispatch as soon as possible.
2. Retain all navigation documents (Master Flight Plan, Plotting Chart, WX Prog Chart, Clearance Messages, AIREP, etc.).
3. At the station of next landing, advise his / her Base Chief Pilot.
4. Within 24 hours, complete a P2 debrief report. Upon return to home base, all other cockpit crewmembers will also prepare a P2 report giving all pertinent details.
5. Upon return to home base, deliver all the navigation documents and all written reports to the Base Chief Pilot.

**PLOTTING CHARTS:**

**FMI 17.5-2 / 3-15-11**

**17.5 Navigational Procedures**

**C. Plotting Charts**

**1.** For flights in the North Atlantic or Pacific Oceanic airspace, use of a plotting chart is always required for flight segments during which the aircraft's position is determined solely by reference to long range navigation equipment, unless the route:

- a) Is under radar contact or,
- b) Uses a charted airway on an enroute navigation chart or,
- c) Is a direct segment between two charted and named waypoints.

**2.** Preparation of a plotting chart, when required, should be accomplished by drawing the oceanic portion of the route and labeling each waypoint.

### 17.5.5 Circle and Tick Procedures.

"Circle and Tick" procedures are required for flight segments during which the aircraft's position is determined solely by reference to long range navigation equipment, unless the route:

1. Is under radar contact or,
2. Uses a charted airway on an enroute navigation chart or,
3. Is a direct segment between two charted and named waypoints.

#### A. Prior to Oceanic Entry

One pilot will read aloud the waypoint names from the FMS while the other pilot checks them against the Oceanic Clearance and the Master Flight Plan, then places a circle (O) next to the waypoint on the Master flight plan.

#### NOTE

The crosscheck of the FMS coordinates should include comparing the expanded coordinates against the flight plan.

#### B. Approaching Each Waypoint

1. Both pilots must verify that the subsequent waypoint name, distance and course agree with the flight plan or current ATC clearance.
2. Draw a diagonal line through the circle beside the waypoint to indicate verification was accomplished

#### NOTE

If any portion of this procedure cannot be accomplished, every means available will be used to determine that the aircraft's present position and routing agree with the flight plan and current ATC clearance.

#### C. Waypoint Passage

1. At waypoint passage, confirm that the next waypoint becomes the active waypoint. Verify that the autopilot is receiving guidance from the FMS, and that it did not revert to heading or track mode.
2. Draw a second diagonal line through the circle beside the waypoint just passed forming an "X", indicating passage.

#### D. Midpoint Check

Midpoint check is required approximately midway between each waypoint:

1. Check ETA to the next waypoint. If waypoint crossing time changed by 3 minutes or more from the last estimate given to ATC, a revised estimate should be transmitted to the ATC unit concerned as soon as possible.
2. Check for satisfactory fuel quantity / balance and trend.

### ETP'S

FMI 17.5.1 / 3-15-11Sec 17, p.35 / 8-20-08

#### 17.5.3 Equal Time Points (ETP) Procedures

D. The location of the ETP(S) should be determined by elapsed time after takeoff, distance remaining to destination and/or the aircraft's Flight Management System (FMS) "Alternates," "Progress" and "Fix" pages.

E. Since the flight plan ETP presumes a worst case scenario, the flight times are based on winds at 15,000 feet. Winds may be different at cruise altitude, particularly in or near jet streams, which may cause the FMS computed ETP (based on winds at cruise altitude) to differ from the flight plan ETP (based on 15,000 feet winds).

Consequently, in the event of a situation occurring near the flight plan ETP causing a diversion to an enroute alternate airport at cruise altitude, the Captain should use the Flight Management System (FMS) to determine the nearest appropriate airport.

**F. If actual fuel is at or below planned fuel at ETP, a diversion is not required unless there is a condition which would preclude continued flight to destination. The ETP critical fuel is a flight planning function only and should not be used as the sole basis for a decision to divert to an alternate.**

#### POSITION REPORTS:

International – FMC position reports auto send. If winds are not loaded, winds must be uplinked. Loading winds relinks auto-send. Domestic = manual send @ TOC / 90m / TOD.

OM1 Systems FMS Navigation 65.7. / 5-1-07:

#### Automatic Company Position Reports

When the route is uplinked to the FMC, waypoints on international flight plans at which AA Dispatch requires a position report are identified in DECS. Enroute, in oceanic and / or remote airspace, when the FMC sequences these selected waypoints, a position report is automatically sent to Dispatch for flight following. When a position report is sent, the FMC POS REPORT page displays "SENDING" then "SENT" at 6R. If the position report is sent automatically, do not send an FMC position report manually because these duplicate reports are also sent to selected Oceanic ATC centers.

If the route is manually loaded into the FMC (e.g., reroute), send for a wind request after the new route is executed. Updating the winds for the new waypoints also updates the automatic position report status for these waypoints and the crew need not send any position reports to Dispatch. If the winds are not updated, you must send position reports to Dispatch manually - this should be a rare occurrence. When position reports are not sent automatically (e.g., when flying in domestic US airspace), you are required to send a company position report:

- At the first waypoint after reaching cruise altitude
- At least every 90 minutes enroute
- At the last waypoint prior to beginning of descent.

### AIREP FORMS:

FMI 17.4-5 / 3-15-11

#### 17.4.14 AA AIREP Form (OF-16)

A. This form is provided to organize and record required reports. It is divided into three sections. The first section contains the items required for a position report. The second section, coupled with the first, constitutes a MET report. The third section is used in the North Atlantic for mid MET reporting in addition to the MET report.

B. The AA AIREP form will be filled out just prior to transmitting the position reports. This requirement must be met whether transmitting the position report via voice or data (e.g. ADS).

C. An AIREP form shall be used when operating in MNPS or Pacific airspace and non-radar position reporting is required. Use of the form at other times is optional.

### REVISED ESTIMATE:

FM2 ATLANTIC EUROPE COVERAGE Sec 2, AA-2.5 / 5-9-08

#### 3. ATC COMMUNICATIONS

##### 3.1 ATC Data Link Communications (777 Only)

**8. In the Atlantic, to update a waypoint estimate (required if estimated time to next point changes by 3 minutes or more), you must make a voice call to ATC.**

### POSITION AND MET REPORTS:

FMI 17.4-5 / 3-15-11

#### 17.4.13 Position Reporting to ATC

A. Position reporting procedures and requirements vary in different geographic areas. Specific and current information is located on the appropriate enroute navigation chart or in Flight Manual Part II, AA Operational Information section.

B. Random routes require position reports as specified on the appropriate enroute navigation chart.

C. Procedures for forwarding position reports to dispatch vary in different geographic regions and are covered in the appropriate Flight Manual Part II, AA Operational Information section.

D. If the estimated time to the next reporting point changes by three minutes or more, or by a time specified by the appropriate ATS or navigation chart, notify the appropriate ATS.

E. The position report will be transmitted at the time of crossing, or as soon thereafter as possible.

#### F. Full MET reports are required when:

1. Specified on the enroute chart, or
2. At the request of the controlling ATS, or
3. Waypoints on a random route, or
4. When the letter "M" is located adjacent to a named reporting fix.

Refer to appropriate Flight Manual Part II, AA Operational Information section, for division specific requirements.

## PERFORMANCE ANOMALY WITH DIRECT TO / ABEAM POINTS:

OM1 System 65.1 PB128 / 11-16-07

### Performance Predictions:

Boeing has received reports of erroneous FMC performance predictions following execution of the ABEAM PTS function on the LEGS page. When OAT values have been previously entered in 5R on the WIND page, and the ABEAM PTS feature is then selected following a "direct-to" flight plan modification, the OAT value on the WIND page erroneously changes to "0" degrees. Subsequently, the fuel predictions are erroneously calculated based upon 0° instead of the previously entered value for the respective cruise altitude. Display of INSUFFICIENT FUEL FMC alert messages and fuel predictions much lower than planned have been reported. Additionally, there are no flight deck annunciations or alerts to the crew to indicate the OAT value on the WIND page has changed.

### Procedure

Following selection of the ABEAM PTS feature, review the ALT / OAT value on the respective WIND page. Re-enter the correct altitude and the indicated SAT (from PROGRESS page 2) on the ALT / OAT line for the next waypoint, if required. This data will propagate to all down track waypoints. Following re-entry of OAT, FMC fuel predictions should be near those on the flight plan.

## RAPID DEPRESSURIZATION:

FM2 ATLANTIC EUROPE COVERAGE, Sec 6, AA6.6, 5.9.08

### 1.14 Rapid Depressurization for Flights North of 66N over Greenland

A. Although terrain over Greenland is similar to the North American Rocky Mountains in height, it's breadth north of 66N requires a slight modification to the Emergency Descent procedure necessary utilizing the supplementary oxygen bottles in the main cabin.

B. Aircraft without a supply of passenger supplemental oxygen are not permitted to operate over Greenland north of 66N. Refer to the aircraft MEL for more information.

### C. Procedures

1. In the event of a Rapid Depressurization / Emergency Descent over Greenland north of 66N:
  - a) follow the procedures in the aircraft QRH.
  - b) after 10 minutes at 17,000' MSL, descend to and maintain 14,000' MSL.
  - c) once you are clear of terrain, descend to 10,000 ft. MSL. Use all means of terrain information available to determine when a safe descent can be made from 14,000' MSL to 10,000' MSL (e.g., charted brown shading, grid MORAs, EGPWS, etc.).

D. The Jeppesen CA (H/L)-9/10 enroute chart contains brown shading showing terrain and corrected grid MORAs for Greenland. OM1 15.6 CLIMB - CRUISE - DESCENT / 3-2-09 777

Refer to the FMC Polar Operations section in Volume II for specifics about operations in polar regions and a description of the boundaries of the polar regions.

Above 82°N, SATCOM is unavailable.

Use caution when using ADF and / or VOR raw data. ADF orientation (true or magnetic) is determined by the heading reference selected by the crew. VOR radials are displayed according to the orientation of the VOR station.

When navigating in the polar regions, magnetic heading should be considered unreliable or totally useless for navigation. Magnetic variations typically are extreme, often are not constant at the same point and change rapidly as airplane position changes. Note that unmapped areas in the GPWS terrain data base display as magenta dots on the map, regardless of the airplane altitude.

The primary roll mode for polar operations should be LNAV, which may be used with the Heading Reference Switch in the NORM position. HDG SEL / HOLD and TRK SEL / HOLD are functional but require the manual selection of TRUE heading reference. Deviations from planned route may be accomplished in TRK SEL or HDG SEL after selection of true heading reference.

If the North Pole (NPOLE) waypoint is used, a rapid heading and track reversal occurs passing the polar waypoint. If operating in HDG / TRK SEL or HDG / TRK HOLD while near either pole, it is necessary to frequently update the Heading / Track Selector to reflect the rapidly changing and / or reversed heading / track or the AFDS will command an unwanted turn. For this reason, LNAV is the preferred roll mode.

**Loss of both GPS units or loss of GPS updating** results in an increased ANP and possible display of the NAV UNABLE RNP message, but normally would not prevent polar operation.

The ADIRU is a fault tolerant unit. Total failure of the ADIRU is an extremely unlikely event since a number of independent failures must occur before all navigation functions are lost. In the unlikely event the ADIRU does fail, the non-normal checklist provides the crew with inoperative items and necessary crew actions. With at least one GPS operational, the Navigation Display is operational and accurately displays the FMC route and airplane track and position information. LNAV is inoperative. A heading reference must be entered into the FMC to regain use of the compass rose. Because of the large and rapidly changing magnetic variations in the polar regions, it may be more practical to enter the true track as a heading reference while in the polar region. This provides a more intuitive navigation display and allow tracking of the planned route in HDG SEL. True track may be obtained by adding or subtracting the local magnetic variation

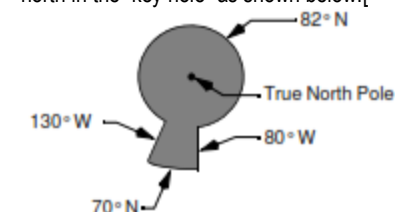
value from the enroute chart to or from the magnetic course on the flight plan. True track is also displayed on the navigation display. Magnetic compass information should be used, if available, to update the heading reference when departing the polar region.

### FMC:

OM1 Systems FMS Navigation 65.1 / 10-1-05

### Polar Operations - FMC

When the airplane position is in the polar region, the FMC automatically switches all flight display inputs to reference true north in the "key hole" as shown below.[]



Automatic switching to a true north reference (PFDs, NDs, AFDS, and FMCs) is annunciated by a flashing white box around the word TRU on the ND. The ND displays a green box around the word MAG to annunciate the change back to magnetic reference. Use caution when using ADF and / or VOR, since the heading reference in use affects the display of raw data. With the heading reference in TRUE, ADF bearings are true and vice-versa. VOR radials are displayed according to the orientation of the VOR station (true or magnetic).

### Legs Page:

OM1 Systems 65.2 / 10-1-05

The waypoints where the heading reference automatically switches from magnetic to true north are displayed on the ACT RTE LEGS page.

ACT RTE 1 LEGS				1/4
053°	292NR			
N75W078		.823 / FL350		
064°	302NR			
N80W080		.823 / FL350		
343°T	63NR			
N81W082		.823 / FL350		
005°T	243NR			
N85W078		.824 / FL350		
332°T	61NR			
N86W080		.824 / FL350		
<RTE 2 LEGS				RTE DATA>

The ACT RTE 1 LEGS shows the magnetic course in 1L and 2L. The course heading in 3L is displayed as a true heading (indicated by a T after the heading). This means at some point between waypoint N80W080 and waypoint N81W082, the heading reference automatically switches from magnetic to true.

**NOTE**

The example above shows the heading reference switching in what is called the "key hole" area of the pole.

Autopilot

When operating the autopilot in the polar region in other than LNAV, the TRUE position on the Heading Reference Switch must be selected. Therefore,

When entering the polar region and automatic switching to a true north reference occurs:

Heading Reference Switch ... TRUE

When exiting the polar region:

Heading Reference Switch .... NORM

**OM1 Systems FMS Navigation 65.3 / 5-1-07**Navigation

Grid heading will be displayed on the ND above 70° latitude. There may be approximately a one minute time delay after passing 70° latitude before the grid heading is displayed. This is a display only. There are no crew procedures associated with grid heading. When navigating in the polar regions, magnetic heading should be considered unreliable or totally useless for navigation. Magnetic variations typically are extreme, often are not constant at the same point and change rapidly as airplane position changes. The primary roll mode for polar operations should be LNAV. HDG SEL / HOLD and TRK SEL / HOLD are functional with the manual selection of TRUE heading reference. Deviations from planned route may be accomplished in TRK SEL or HDG SEL. If either the North Pole (NPOLE) or the South Pole (S90EXXXXX or S90WXXXXX) waypoint is used, a rapid heading and track reversal occurs passing the polar waypoint. If operating in HDG / TRK SEL or HDG / TRK HOLD while near either pole, it is necessary to frequently update the Heading / Track Selector to reflect the rapidly changing and / or reversed heading / track or he AFDS will command an unwanted turn. For this reason, LNAV is the preferred roll mode. Loss of both GPS units results in an increased ANP and possible display of the NAV UNABLE RNP message but normally would not prevent polar operation.

**ETOPS DIVERSION:**

If diverting for a non-mx reason with an open, non-Crew placardable ETOPS required item in the logbook, a new ETOPS ER-2 check and sign off is required. If diverting for a non-maintenance reason with no open items, TULE Tech Services can send a message authorizing continuation of the ETOPS flight after a normal preflight.

**FMI 17.3-4 / 3-15-11****17.3.8 ETOPS Maintenance Check Policy - In-Flight Diversion**

Reference: 14 CFR 121.374(h)(1)

**A. Diversion for Maintenance Reasons**

1. If an ETOPS flight diverts for maintenance reasons, an "ETOPS 2" check must be performed prior to continuing flight under ETOPS rules. Only ETOPS qualified technicians with an A&P rating (or equivalent) may be used to perform an ETOPS check.

**B. Diversion for Non-Maintenance Reasons**

1. In the event of an ETOPS flight diversion into any AA maintenance station where ETOPS qualified mechanics are available, an ETOPS 2 check must be accomplished prior to continuing flight under ETOPS rules.

2. If an ETOPS flight diverts for non-maintenance reasons into a station that does not have AA ETOPS qualified mechanics assigned, an ETOPS maintenance check is not required provided there are no open non-flight crew placarded E6 items that are required for ETOPS operations. (TULE Tech Services may be consulted for specific requirements.) TULE Tech Services will send a message authorizing the aircraft to continue under ETOPS rules after a normal pre-flight inspection (per the AA Operating Manual) has been accomplished. If the aircraft landed overweight, an overweight inspection may be accomplished by contract maintenance as authorized by MOC MOD.

**FMI 17.4-5 3-15****17.4.15 Maintenance at Offline Airports**

For operations into offline or alternate airports that do not have AA or contract maintenance, no maintenance may be performed except by a licensed mechanic authorized by AA Maintenance. This authorization may be obtained from the TUL MOD by telephone, via HF, or SATCOM through dispatch. Refer to Chapter 2 for contact information.

**SATCOM:****OM1 Systems Communications 35.5 / 5-1-07**

Preset Dispatch / Tech / ATC – use menu or type ATC # from Division Guide or Jeppesen Charts.

**FMI 17.4-1 / 3-15-11****17.4.11 SATCOM Voice**

A. HF is the normal means of communications for position reporting and ATC clearances.

B. SATCOM VOICE may only be used to contact SOC / Dispatch / ATC.

C. SATCOM VOICE should be used in abnormal situations or when normal means of communications with dispatch cannot be established.

D. Flight Attendants are authorized to use the cabin SATCOM phone for obtaining assistance for video equipment, with approval of the Captain.

**PRINTER:****Pre-Flight / OM1 Systems Communications 35.1 / 10/1-05**

Check that printer paper supply is adequate by pressing the Printer SLEW Switch.

The last 5 to 12.5 feet of paper has a single stripe to indicate a low paper supply. The last 5 feet of paper has a double stripe. When the single stripe appears, examine the installed roll. If it obviously contains an adequate supply of paper for longer use, continue to use it. Change paper if supply is low. Make a numbered "Info to Maintenance" entry in the E6 if spare paper is used.

Allowing printer to run out of paper may cause roller damage. If spare paper is not available, send a Printer Inoperative report from the Status Message Page and make an entry in the E6 stating that the printer is out of paper.

NOTE: If printer appears inoperative, it may be due to a previously sent PRINTER INOPERATIVE message remaining in DECS. If the printer is not placarded inoperative, initiate a Printer Operative report via ACARS to advise DECS that the printer is operative.

**EICAS STATUS MESSAGES:**

*CKA Standards Meeting Briefing Item:*

*ACARS msg status messages to Dispatch EICAS and STATUS messages are now captured and automatically transmitted.*

**OM1 SYSTEMS 35.7 / 5-1-07****Automatic Reports**

Automatic reports requires no input from the pilots. All current trip flight deck effects that generate EICAS messages and the associated maintenance messages are automatically downlinked via ACARS at top of descent.

**POSITION REPORTS:**

*International reports are automatic unless the winds have not been loaded. If reports are not automatically sending, uploading winds will relink international auto reporting.*

**OM1 Systems FMS Procedures 66.19 / 5-1-07****Position Reporting**

PROG Function Key.....PRESS  
Displays PROGRESS page.

POS REPORT [ 6L ].....PRESS  
Displays POS REPORT page. This page contains reference data only.

Manual entries are inhibited. Position Report format includes:

- Previous active waypoint (POS) and ATA
- Current airplane altitude
- Active waypoint (EST) and ETA
- Waypoint after active waypoint (NEXT)
- Current OAT

- Current wind direction and speed
- Fuel on board at POS waypoint.

**NOTE:**

Scratchpad line may be used to send additional information; e.g., LIGHT CHOP.

REPORT [ 6R ] ..... PRESS  
Transmit a downlink of the data on the POS REPORT page.

**RERELEASE:**

FM1 7.4-4 / 3-15-11

**17.4.12 Re-release Procedures**

A. The ATC flight plan is filed to the scheduled destination. However, dispatch releases the flight to an "intermediate" airport. The fuel plan meets all requirements including the 10% enroute reserve (E/RSV) to the intermediate airport and is displayed in the left hand column of the fuel block.

B. The re-release is normally transmitted by dispatch to the flight within two hours prior to arrival at the designated re-release point, but no later than the re-release point. The re-release states the minimum re-release fuel based on updated conditions. Weather and/or field conditions at the destination or alternate airport will be included if there are changes since the original weather briefing.

C. If the re-release has not been received one hour prior to the re-release point, the Captain should attempt contact with dispatch using any available means of communication (VHF, HF, ACARS and SATCOM).

D. If the flight has received a re-release from dispatch upon arrival at the re-release point (indicated by an asterisk next to the waypoint identifier in the flight plan) and the specified fuel is aboard, the flight may proceed to the scheduled destination.

E. If a re-release from dispatch has not been received by the re-release point, the flight must proceed to the intermediate airport or its alternate.

**PRIOR TO DESCENT:**

*Technique: The F/A's will begin final meal service prep on international flights approximately 90 minutes prior to landing and begin the meal service itself about 45 minutes prior to landing. If turbulence is expected, advise them to begin early and expect to be seated. Ask for cabin writeups to be passed forward not later than one hour before landing so that there is time to make E6 entries and look up and send ARM codes via ACARS.*

- Advise Flight Attendants of expected ON time so that galleys may be secured in time for landing.

- Request cabin write-ups.

**DESCENT:****ALTIMETER PROCEDURES:**

FM1 7.4-2 / 3-15-11, Sec 17, p.29 / 4-4-08

**17.4.6 Altimeter Procedures**

A. Foreign Civil Aviation Authorities controlling airspace within their respective areas of responsibility establish local altimeter transition altitudes and flight levels. These normally follow standard ICAO procedures and can be found in various flight publications (enroute charts, approach plates, area charts). Flight crewmembers should check the latest flight publications to ensure compliance.

B. When cleared to climb to a flight level above the transition altitude, the altimeters will be reset to QNE (29.92"Hg / 1013 hPa) when approaching the transition altitude. If a subsequent clearance to level off at or below the transition altitude is received, the altimeters must be reset to QNH prior to level off.

C. When cleared to descend, ATC will provide the appropriate airport QNH if cleared to an altitude below the transition level. Set the airport QNH when approaching the transition level. If a subsequent clearance to level off at or above the transition level is assigned, the altimeters must be reset to QNE (29.92"Hg / 1013 hPa).

D. When flying at or above the transition level, QNE altimeter setting (29.92"Hg / 1013 hPa) is to be used and the height of the aircraft is to be expressed in terms of flight levels.

E. The standard unit for pressure settings at a particular airport (inches, millibars / hectopascals) is depicted on the approach plate below the communications frequencies. **Since hectopascals (millibars) are the ICAO standard unit for pressure settings, controllers are not required to include the word "hectopascals" or "millibars" when transmitting pressure settings. Use of those words is optional.**

**DESCENT ANALYSIS:**

OM1 Systems FMS Procedures 66.22 / 11-1-06

**Offpath Descent Analysis**

The OFFPATH DES page allows analysis of descent performance off the present route of flight, direct to a selected waypoint.

VNAV Function Key – PRESS / Displays ECON DES page when the FMC is in the descent phase.

OFFPATH DES [ 6L ] – PRESS / Displays OFFPATH DES page.

Selected Waypoint – Enter selected waypoint for direct-to analysis. A manual waypoint entry displays boxes at 1R for manual speed and altitude entry.

Speed / Altitude Restriction – ENTER at 1R / Enter the speed / altitude restriction.

DISPLAY OFF <> ON [ 6R ] – PRESS / Pressing 6R alternates between ON and OFF of the clean and drag circles on the ND.

The drag circle is not displayed until the airplane position is inside the clean circle.

TO CLEAN [ 2R ] / TO DRAG [ 3R ] – OBSERVE / Observe the distances to the clean and drag descent circles. The distance is negative when a clean / drag descent is not possible.

**DESCENT SPEED:**

OM1 Climb Cruise Descent 20.3 / 11-1-09

**Standardized Descent Speed**

*Technique: Manually enter the FMC descent speed before reaching TOD.*

A standardized descent speed allows ATC to more efficiently plan arrivals and help reduce congestion and delays caused by non-standard descent speeds.

The ECON DESCENT speed will vary based on the CI. The lowest descent speed is 250 knots, which may not be operationally acceptable. Normally a descent speed should be manually entered into the VNAV DES page prior to the top of descent. Once past the top of descent, the CI cannot be changed and speed changes must be made on the VNAV DES page or on the MCP.

At domestic stations and most international stations, descend using the following descent schedule:

- Cruise mach to the 290 knots crossover altitude.
- 290 knots to 10,000 feet.
- 250 knots below 10,000 feet.

**NOTE**

Faster descent speeds (.840 / 320 knots maximum) should be considered for late arrivals. Lateness costs can be significant.

If another speed is desired, coordinate with ATC. At some international stations an optimum (CI generated) descent speed should be considered where experience and judgement indicate no ATC conflict. This should only be considered for early / scheduled arrivals.

**HOLDING:**

OM1 Systems Climb Cruise Descent 20.5 / 11-1-06

Start reducing to holding airspeed three minutes or less from the holding fix. The holding speeds in the FMC provide minimum drag speeds, but in no case lower than flaps up maneuvering speed. If the holding speed is not available from the FMC, flaps up maneuvering speed approximates minimum fuel burn speed and may be used at low altitudes. Above FL250, use VREF 30 + 100 knots to provide adequate buffet margin.

**NOTE**

Using flaps 1 during holding uses approximately 7% more fuel than flaps up.

Maintain clean configuration if holding in icing conditions or in turbulence.

If the holding pattern has not been programmed in the FMC, the initial outbound leg should be flown for 1 minute or 1 1/2 minutes as required by altitude. Timing for subsequent outbound legs should be adjusted as necessary to achieve proper inbound leg timing.

#### OM2 Flight Management Navigation 43.31 / 3-18-05 Holding

The FMC computes holding patterns with constant radius turns based on current wind and FMC commanded airspeed. The pattern size is limited to FAA or ICAO protected airspace. In LNAV, the AFDS tracks the holding pattern using up to a 30 degree bank angle. Strong winds or airspeed in excess of FAA or ICAO entry speeds may result in the airplane flying outside the protected airspace. With LNAV active before sequencing the holding fix, holding pattern entries are determined by the following:

- Airplane track, not heading or direction from which the active route approaches the holding pattern, determines the entry method used (parallel, teardrop, or direct entry).
- The airplane flies the initial outbound leg a computed distance from the holding fix, rather than a specific time. The computed distance is a function of the command airspeed and computed wind at the time the holding pattern becomes active.
- Teardrop entries use a 40 degree offset angle.

• Parallel and teardrop entries may cause the airplane to fly beyond the displayed holding pattern; however, the airplane remains in protected FAA or ICAO limits.

#### Holding Entry

Airplane track to the holding fix determines the entry type; direct, teardrop, or parallel. To make efficient use of the holding airspace, lateral guidance may direct the initial turn to the holding pattern prior to crossing the holding fix (fly-by). The holding entry path displays on the ND. For all holding entry types, lateral guidance directs the airplane to fly-by or fly-over the holding fix and to remain on the holding side of the inbound holding course. Depending on the entry track for a direct entry, the flight path may extend slightly beyond the displayed outbound holding turn. For teardrop and parallel entries, the flight path remains within the confines of the depicted holding pattern displayed on the ND. Remaining within the prescribed holding airspace requires the airplane to be at holding airspeed at the holding fix.



#### Hold Page (First Hold)

The HOLD page is used to enter a holding pattern in the route.

When the flight plan does not contain a holding pattern, pressing the HOLD Function Key displays the RTE X LEGS page with the HOLD AT line.

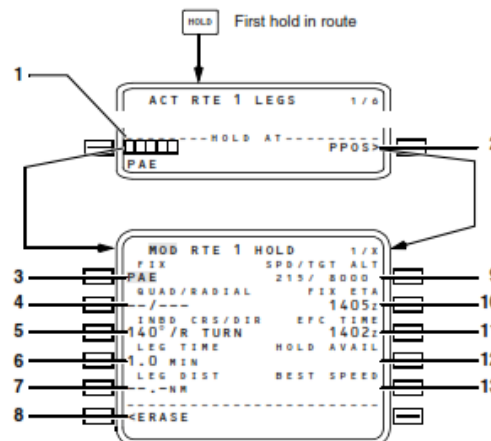
Two versions of the hold page are possible:

- An airway or procedure holding pattern
- A flight crew-entered holding pattern.

The holding page displays actual or default data about the holding pattern.

Entries make route modifications, which can be erased or executed.

Active holding patterns are magenta on the ND.



#### 1. HOLD AT

Displays boxes to enter the holding fix: a RTE LEGS, database, or pilot-defined waypoint; a navaid or airport identifier; or a FAF already in the flight plan. Entering a holding fix displays the RTE X HOLD page.

#### 2. HOLD AT Present Position (PPOS)

Press -

- Creates a holding pattern at present position.
- Execution establishes the holding fix at the position when EXEC is pressed and displays RTE HOLD.

#### 3. Holding FIX

Displays the holding fix.

#### 4. Quadrant / Radial (QUAD / RADIAL)

Normally displays dashes. Valid entry is X / XXX, XX / XXX, or / XXX. Example: NW / 330. Entry changes INBD CRS / DIR to agree.

#### 5. Inbound Course / Direction (INBD CRS / DIR)

Displays inbound course and turn direction. Valid entry is XXX (inbound course), XXX / X (inbound course / turn direction), / X or X (turn direction). Entry changes QUAD / RADIAL to agree.

Displays magenta when the holding fix is the active waypoint.

#### 6. Leg Time (LEG TIME)

Displays 1.0 MIN (minute) at or below 14,000 feet. Displays 1.5 MIN above 14,000 feet. Displays dashes when an entry made on LEG DIST line. Valid entry is X, X.X, or .X.

When climbing / descending through 14,000 feet with VNAV active and the SPD / TGT ALT at 1R displays in large font, the FMC adjusts the leg time (1.0 MIN at or below 14,000 feet; 1.5 MIN above 14,000 feet).

#### 7. Leg Distance (LEG DIST)

Normally displays dashes. Allows entry of leg distance for hold. Entry displays dashed on LEG TIME line. Valid entry is XX.X or X.X.

#### 8. ERASE

Erases all FMC modifications.

#### 9. Speed / Target Altitude (SPD / TGT ALT)

Dashes display or fix speed / altitude constraint from the RTE LEGS page. Manual entries are in large font. During cruise, entry of a target altitude lower than CRZ ALT modifies the DESCENT page and displays a T/D. After T/D, the DESCENT page remains active unless a new cruise altitude is entered. Speed or altitude may be entered.

#### 43.34 / 10-25-04

#### 10. FIX ETA

With no EFC TIME entry, displays time the airplane will next pass the holding fix. With EFC TIME entry, displays time the airplane will pass the holding fix after the EFC time. The FMC uses this time to calculate downtrack ETAs and fuel values based on departing the holding fix at the new FIX ETA.

#### 11. Expect Further Clearance Time (EFC TIME)

Normally displays dashes. Valid entry is XXXX (time).

Entry changes performance predictions for the route after holding.

#### 12. Hold Available (HOLD AVAIL)

Displays holding time available, before exit is required, to reach the destination with the required reserve fuel. (If enroute to the holding fix, indicates holding time available once the airplane arrives at the holding fix.)

#### 13. Best Speed (BEST SPEED)

Displays the best holding speed for the airplane gross weight, altitude, and flap setting. NOTE May exceed ICAO limit speed.

#### 43.36 / 3-18-05

#### Hold Page (Existing Hold)

When one or more holding patterns exist in the route, press the HOLD Key to display the HOLD page for the first holding pattern. When the hold is the next LNAV event, the active commands display in magenta. Holding parameters can be monitored and changed on this page. New holding patterns are added using the NEXT HOLD prompt. Most holding patterns are part of a procedure or airway and remain active until the flight crew

executes an exit from holding. This may be accomplished in one of two ways.

- On the ACT RTE LEGS page, deleting or bypassing the HOLD AT waypoint causes LNAV to command a direct to the next waypoint.
- On the ACT RTE HOLD page, selecting and executing EXIT HOLD> causes LNAV to command the airplane to adjust the holding pattern size to provide the shortest route to the holding fix, at which time the airplane exits the holding pattern. Following execution of the exit hold, only the remaining portion of the holding pattern back to the holding fix displays. Exit from the holding pattern may occur prior to crossing the holding fix ("fly-by") if the course to the next waypoint is not closely aligned with the holding inbound course. The exiting flight path will remain within the confines of the protected holding airspace. The exit flight path displays on the ND. At high groundspeed and extreme exit track angles (angle between the course to the next route waypoint and the inbound course to the holding fix), a path discontinuity, typically in the shape of a "Z", may display on the ND as the exit flight path. In all instances, LNAV provides appropriate lateral guidance to intercept the active leg to the next route waypoint. The FMC automatically commands an exit from some holding patterns in procedures under the following conditions.
- For instrument approach holding patterns designed as a course reversal in lieu of a procedure turn, the airplane exits holding upon arrival at the holding fix inbound. Header at 1L displays PROC HOLD.
- For some holding patterns in SIDs, the airplane exits holding when arriving at an altitude. Header at 1L displays HOLD AT.

#### AIRSPEED:

OM1 Climb Cruise Descent 20.4 / 11-1-06

#### Descent Planning

The distance required for the descent is approximately 3 nm / 1000 feet altitude loss for no wind conditions using ECON speed. The approximate descent rates available below 20,000 feet with idle thrust, clean or with speedbrakes are shown in the table below.

Target Speed	Rate of Descent	
	Clean	With Speedbrakes
310 kts / .84 m	2200 fpm	5300 fpm
250 kts	1400 fpm	3300 fpm
VREF 30 + 80 kts	1000 fpm	2300 fpm

Normally, descend with idle thrust and in clean configuration (no speedbrakes). Maintain cruise altitude until the proper distance or time out for the planned descent and then hold the selected airspeed schedule during descent. Deviations from this schedule may result in requiring extra time and fuel to reach destination.

The speedbrakes should be used to correct the descent profile if arriving too high or too fast.

Losing airspeed may require a level flight segment. For planning purposes, it requires approximately 60 seconds and 6 nm to decelerate from 310 to 250 knots in level flight without speedbrakes (1 knot / second). It requires an additional 50 seconds and 4 nm to decelerate to flaps up maneuvering speed at average gross weights. Using speedbrakes to aid in decel reduces these times and distances by approx 50%.

#### LANDING:

#### See Attachment 1: Landing Zone

#### DRAG:

OM1 Climb Cruise Descent 20.4 / 11-1-06

#### Speedbrakes

While the speedbrakes are deployed, the pilot-flying should keep the throttle hand on or near the Speedbrake Handle.

If circumstances dictate the use of speedbrakes with flaps extended, retract speedbrakes before reaching 1000 ft AGL. The aircraft buffets if speedbrakes are used with flaps more than 5 degrees.

#### Flaps and Landing Gear – Use as Drag Devices

The landing gear can be lowered to increase the rate of descent.

NOTE: Avoid using the landing gear for drag above 200 knots.

This will minimize passenger discomfort and increase gear door life. The flaps should not be used as drag devices. The landing gear can be lowered to increase the rate of descent.

#### FLAP EXTENSION:

OM1 Approach Ldg GA Appch Gen 15.1 / 10-25-10

#### Flap Configurations for Approach and Landing

During maneuvering for an approach, when the situation dictates an earlier than normal speed reduction, the use of flaps 15 or flaps 20 with the gear up is acceptable.

#### Flap Setting for Landing

Flaps 25 or 30 are normal landing flap settings.

Use of flaps 25 is normally preferred:

- More fuel efficient.
- Better noise abatement.
- Reduced flap wear.
- For improved maneuverability during high (gusty) wind conditions.

#### NOTE

The 777 is not certified for flaps 25 autoland.

Use of flaps 30 is recommended when landing:

- With braking action reported less than good.

- With tailwind.
- On a short runway (less than 8000 feet).
- On a wet / contaminated runway.
- When deemed prudent by the Captain.

#### Flap Extension

During flap extension, selection of the flaps to the next flap position should be made when approaching, and before decelerating below, the maneuver speed for the existing flap position. The flap extension speed schedule provides full maneuver capability of at least 40° of bank (25° angle of bank and 15° overshoot) to stick shaker at all weights.

#### Maneuver Margin

Flight profiles should be flown at, or slightly above, the recommended maneuver speed for the existing flap configuration. These speeds approximate maximum fuel economy and allow full maneuvering capability (25° bank with a 15° overshoot).

Full maneuver margin exists for all normal landing procedures whenever speed is at or above the maneuver speed for the current flap setting. At least adequate maneuver margin exists with flaps 20 at VREF 30 + 5 during a go-around at go-around thrust.

Airspeeds recommended for non-normal flight profiles are intended to restore near normal maneuvering margins and / or aerodynamic control response.

The configuration changes are based on maintaining full maneuvering and / or maximum performance unless specified differently in individual procedures. It is necessary to apply wind additives to the VREF speeds.

#### PREDICTIVE WINDSHEAR:

See TAKEOFF section of this guide for expanded information.

Refer to QRH Maneuvers Windshear

What happens in the airplane may not be what you expect – simulator training concentrates on the escape maneuver, but the PWS system gives a variety of different warnings.

OM1 Systems Warning Systems 85.2 / 11-1-07

OM2 Warning Systems 10.19 / 9-16-08

OM2 Warning Systems 60.1-3 / 10-25-04

QRH Maneuvers Windshear

GPWS Windshear Alert and Predictive Windshear System

(PWS):

In Flight B777 PWS Alerts: Downdraft / TW / LLWS

WX radar selected +12 sec startup

Appch: scans <2300' / alerts <1200'

CAUTION Zone = ±25°x3nm

WARNING Zone = 1.5nm ahead @ 0°

**"G/A WINDSHEAR AHEAD"**

Annunciation = LLWS <1200' RA / w/i 1.5nm on Appch

Red PFD/ND WINDSHEAR msg / MWrg /

+ND red LLWS symbol MAP/CTR/VOR/APP modes only

**"MONITOR RADAR DISPLAY"**

Annunciation=LLWS <1200' RA / w/i 1.5nm Appch

Amber ND WSHR msg

+ND red LLWS symbol MAP/CTR/VOR/APP modes only

B777 GPWS Immediate LLWS Alert:

**"WINDSHEAR WINDSHEAR WINDSHEAR"**

Annunciation=LLWS <1500' RA on Appch

Red PFD WINDSHEAR msg / MWrg

**APPROACH SPEED:**

[OM1 Appch Landing GA 15.3 / 10-25-10](#)

**Approach Speed / Wind Additives**

When using the autothrottle, position command speed to VREF + 5 knots. Sufficient wind and gust protection is available with the autothrottle connected because the autothrottle is designed to adjust thrust rapidly when the airspeed drops below command speed while reducing thrust slowly when the airspeed exceeds command speed. In turbulence, the result is that average thrust is higher than necessary to maintain command speed.

If a manual landing is planned with the autothrottle connected in gusty or high wind conditions, consider positioning the command speed to VREF + 10 knots. This helps protect against a sudden loss of airspeed during the flare.

If the autothrottle is disconnected, or is planned to be disconnected prior to landing, the recommended method for approach speed correction is to add one half of the reported steady headwind component plus the full gust increment above the steady wind to the reference speed. The minimum command speed setting is VREF + 5 knots. One half of the reported steady headwind component can be estimated by using 50% for a direct headwind, 35% for a 45° crosswind, zero for a direct crosswind and interpolation in between.

When making adjustments for winds, the maximum approach speed should not exceed VREF + 20 knots. The following table shows examples of wind additives with a runway heading of 360°.

*VREF is displayed reflecting the FMC value selected on the CDU by the crew. NOTE: If you turn the auto throttles off during approach for any reason you must add the wind correction to the approach speed and maintain that airspeed to landing as above.*

**STABILIZED APPROACH:**

[Stabilized Approach Requirements \(FAA Order 8900.1\)](#)

[OM1 Approach Landing GA 15.4 / 10-25-10](#)

**Stabilized Approach Requirements**

(FAA AC 120-71A and AA Policy)

Significant speed and configuration changes during an approach can complicate aircraft control, increase the difficulty of evaluating an approach as it progresses, and complicate the decision at the decision point; e.g., DA, DH, MDA. A pilot must assess the probable success of an approach before reaching the decision point. This requires the pilot to determine that requirements for a stabilized approach have been met and maintained.

To limit configuration changes at low altitude, the airplane must be in landing configuration by 1000 feet AFL (gear down and landing flaps).

A stabilized approach must be established before descending below the following minimum stabilized approach heights:

- IMC – 1000 feet AFL
- VMC – 500 feet AFL.

Normal bracketing is defined as small corrections in airspeed, rates of descent and variations from lateral and vertical path. Normal bracketing is a part of any instrument or visual approach procedure. Frequent or sustained variations are not normal bracketing excursions and are not acceptable.

A stabilized approach with normal bracketing means the airplane must be:

- At Approach Speed
  - Minimum: Approach Speed - 5 knots
  - Maximum: Approach Speed + 10 knots.
- On the proper flight path at the proper sink rate.
- At stabilized thrust (spooled up).

If the stabilized approach requirements cannot be satisfied by the minimum stabilized approach heights or maintained throughout the rest of the approach then the Pilot-Flying is responsible for executing a go-around. If the Pilot-Monitoring observes that the Pilot-Flying is not executing a go-around, he or she is responsible for directing a go-around. The directed go-around will be executed unless an emergency situation overrides this requirement.

**CROSSWINDS WITH 2 ENGINE REVERSE:**

[Appch Landing GA 45.10 / 4-30-10](#)

To correct back to the centerline, reduce reverse thrust to reverse idle and release the brakes. This minimizes the reverse thrust side force component without the requirement to go through a full reverser actuation cycle, and improve tire cornering forces for realignment with the runway centerline. Use rudder pedal steering and differential braking as required, to prevent over correcting past the runway centerline. When re-established near the runway centerline, apply maximum braking and symmetrical reverse thrust to stop the airplane.

**SIDESLIP:**

[OM1 Appch Landing GA 45.11 / 4-30-10](#)

To ensure adequate ground clearance and maintaining adequate control margin, sideslip only (zero crab) landings are not recommended in crosswinds in excess of 31 knots. If the crew elects to fly the sideslip to touchdown, it may be necessary to add a crab during strong crosswinds. Main gear touchdown is made with the upwind wing low and crab angle applied. As the upwind gear touches first, a slight increase in downwind rudder is applied to align the airplane with the runway centerline. At touchdown, increased application of upwind aileron should be applied to maintain wings level.

**TOUCHDOWN IN CRAB:**

[Approach Landing Go Around 45.10 / 4-30-10](#)

The airplane can land using crab only (zero side slip) up to the landing crosswind guidelines.

On dry runways, upon touchdown the airplane tracks toward the upwind edge of the runway while de-crabbing to align with the runway. Immediate upwind aileron is needed to ensure the wings remain level while rudder is needed to track the runway centerline. The greater the amount of crab at touchdown, the larger the lateral deviation from the point of touchdown. For this reason, touchdown in a crab only condition is not recommended when landing on a dry runway in strong crosswinds.

On very slippery runways, landing the airplane using crab only reduces drift toward the downwind side at touchdown, permits rapid operation of speedbrakes and autobrakes because all main gears touchdown simultaneously, and may reduce pilot workload since the aircraft does not have to be de-crabbed before touchdown. However, proper rudder and upwind aileron must be applied after touchdown to ensure directional control is maintained.

*Technique: If decrabbing to a sideslip, power must be added to maintain the glide path when centering the nose and leveling the wings, since the cross controls adds a large amount of drag and the aircraft can sink rapidly. Recommend transition early for strong crosswinds.*

**FLARE:**

[OM1 Appch Landing GA 45.12 / 10-25-10](#)

**Flare and Touchdown**

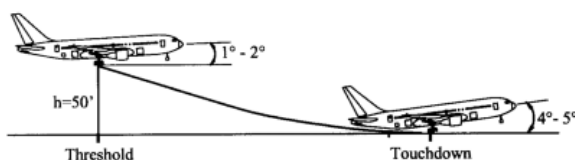
When the threshold passes under the airplane nose and out of sight, shift the visual sighting point to the far end of the runway. Shifting the visual sighting point assists in controlling the pitch attitude during the flare. Maintaining a constant airspeed and descent rate assists in determining the flare point. Initiate the flare when the main gear is approximately 20 feet above the runway by

increasing pitch attitude approximately  $2^{\circ}$  -  $3^{\circ}$ . This slows the rate of descent.

If the autothrottle is engaged, the thrust lever begins to reduce toward idle at 25 feet. If the autothrottle is not engaged, after the flare is initiated, smoothly retard the thrust levers to idle, and make small pitch attitude adjustments to maintain the desired descent rate to the runway. Ideally, main gear touchdown should occur simultaneously with thrust levers reaching idle. Hold sufficient back pressure on the control column to keep the pitch attitude constant. A touchdown attitude as depicted in the graphic below is normal with an airspeed of approximately VREF plus any gust correction.

#### NOTE

Do not trim during the flare or after touchdown. Trimming in the flare increases the possibility of a tail strike.



#### BODY, TAIL AND WING CLEARANCE:

[OM1 Appch Landing GA 45.14-16 / 10-30-10](#)

Aircraft ground contact will occur @ slightly > than  $10^{\circ}$  of pitch or roll (aft body or engine).

[OM1 45.13 / 10-25-10](#)

#### NOTE

Do not increase the pitch attitude after touchdown; this could lead to a tail strike.

#### SPEEDBRAKES:

[OM1 Appch Landing GA 45.18 / 4-30-10](#)

[Speedbrakes](#)

#### NOTE

Unless inoperative per the MEL or Checklist, the speedbrakes must be armed for all landings.

If speedbrakes are not raised after touchdown, braking effectiveness may be reduced initially as much as 60%.

#### REVERSE:

[OM1 Appch Landing GA 45.17 / 10-25-10](#)

[Reverse Thrust Operation](#)

Reverse thrust is most effective at high speeds.

After touchdown, with the thrust levers at idle, rapidly raise the reverse levers up and aft to the interlock position, then apply reverse thrust as required. The PM should monitor engine operating limits and call out any engine operational limits being

approached or exceeded, any thrust reverser failure, or any other abnormalities.

Maintain reverse thrust as required, up to maximum, until the airspeed approaches 60 knots. At this point start reducing the reverse thrust so that the reverse thrust levers are moving down at a rate commensurate with the deceleration rate of the airplane. The thrust levers should be positioned to reverse idle by taxi speed, then to full down after the engines have decelerated to idle. Reverse thrust is reduced to idle between 60 knots and taxi speed to prevent engine exhaust re-ingestion and to reduce the risk of FOD.

#### NOTE

If an engine surges during reverse thrust operation, quickly select reverse idle on both engines.

The PM should call out 60 knots to assist the pilot flying in scheduling the reverse thrust. The PM should also call out any inadvertent selection of forward thrust as reverse thrust is cancelled.

#### BRAKES:

[OM1 45.22 / 4-30-10](#)

[Carbon Brake Life](#)

Brake wear is primarily dependent upon the number of brake applications. For example, one firm brake application causes less wear than several light applications. Continuous light applications of the brakes to keep the airplane from accelerating over a long period of time (riding the brakes) to maintain a constant taxi speed produces more wear than proper brake application.

During taxi, proper braking should involve applying brakes to decelerate the airplane, releasing the brakes when the lower speed is attained and allowing the airplane to accelerate, then repeating.

During landing, one hard, high energy, long-duration brake application produces the same amount of wear as a light, low-energy, short application. This is different from steel brakes that wear as a function of the energy input during the stop.

For normal landing conditions, autobrakes 2 or 3 optimizes brake wear, passenger comfort, and stopping performance. Since autobrake settings apply the brakes dependant upon the deceleration rate, an automatic setting of 1 results in a higher probability that the autobrakes will modulate, especially when the reversers are used. Autobrakes 2 or 3 results in a continuous brake application, which can increase carbon life.

#### GO AROUND:

[OM1 Appch Landing GA 50.1 / 3-20-09](#)

#### Go-Around / Missed Approach Procedure

Pilot-Flying	Pilot-Monitoring
Simultaneously push throttles forward, press TO / GA Switch, and call out – "Go-Around, Flaps 20" (flaps 5 optional for single engine).	Position Flap Handle to 20 or 5.
Verify rotation to go-around attitude and thrust increase.	
	Verify thrust adequate for go-around; adjust if necessary.
When positive rate of climb has been indicated on the altimeter, call out – "Positive Rate, Gear Up" and give palm up hand signal.	Verify positive rate of climb, then position Landing Gear Lever UP.
Call out – "Set Missed Approach Altitude".	Set or verify missed approach altitude set.
Limit bank angle to 15 degrees if airspeed is below minimum maneuver speed.	
Above 400 feet, select LNAV or appropriate roll mode.	
At 1000 feet AGL, call out – "Set Speed" or "VNAV" (Use "Set Speed" if single engine).	Set MCP speed to the "up" bug or the maneuvering speed for the desired flap setting.
Call out – "Flaps ___" according to flap retraction schedule.	Position Flap Handle as directed.
After flap retraction, select FLCH or VNAV as required.	
Verify climb thrust (CON thrust if single engine).	
Verify missed approach route being tracked and missed approach altitude capture.	

Press TO / GA and ensure go-around thrust is set or manually apply go-around thrust and select flaps 20 (flaps 5 optional for single engine) while rotating to go-around attitude. Retract the landing gear after a positive rate of climb is established. At acceleration altitude (1000 feet AGL), select VNAV or set command speed to flaps up maneuvering speed (use "Set Speed" if single engine), and retract flaps on schedule. Auto speedbrakes retract and autobrakes disarm as throttles are advanced for a go-around initiated after touchdown.

[OM1 Appch Landing GA 50.2 / 10-1-05](#)

[Go-Around / Missed Approach - All Engines Operating](#)

An autopilot / autothrottle (if engaged) go-around is recommended. If touchdown occurs after an automatic go-around is initiated, the go-around will continue.

If a missed approach is required following an autopilot approach, leave the autopilots engaged. If autothrottles were disengaged, they will engage when TO / GA Switches are pressed.

During an automatic go-around initiated at 50 feet, approximately 30 feet will be lost. The expected altitude loss during an automatic go-around initiated below 100 feet AFL is listed below. Go-Around

Altitude	Altitude	Loss in Feet
	40 to 100	37
	30	28
	20	18
	10	9
	5	5

At typical landing weights, actual thrust required for a normal go-around is usually considerably less than maximum go-around thrust. This provides a thrust margin for windshear or other situations requiring maximum thrust. If full thrust is desired after thrust for the nominal climb rate has been established, press TO / GA Switch a second time. If TO / GA is selected when airborne, LNAV and VNAV disengage.

If a missed approach is required following a manual instrument approach or visual approach, press TO / GA Switch, call for flaps 20, ensure / set go-around thrust, and rotate smoothly toward 15° pitch attitude. Then follow flight director commands and retract the landing gear after a positive rate of climb is indicated on the altimeter.

If touchdown occurs after a go-around is initiated, the go-around continues. Observe that the autothrottles apply go-around thrust or manually apply go-around thrust as the airplane rotates to the go-around attitude.

#### NOTE

**Automatic go-around cannot be initiated after touchdown.**

The TO / GA pitch mode initially commands a go-around attitude and then transitions to speed as the rate of climb increases. This speed is normally between command speed and command speed + 25 knots. The TO / GA roll mode maintains existing ground track. Above 400 feet AGL, select a roll mode as appropriate.

**If initial maneuvering is required during the missed approach, accomplish the missed approach procedure through gear up before initiating the turn. Delay further flap retraction until initial maneuvering is complete and a safe altitude and appropriate speed are attained.**

**Command speed should not be increased until a safe altitude or flap retraction altitude is attained.** Accelerate to flap retraction speed by repositioning the command speed to the maneuvering speed for the desired flap setting. Retract flaps on the normal flap / speed schedule. When the flaps are retracted and the airspeed approaches maneuvering speed, select FLCH and ensure CLB thrust is set. Verify the airplane levels off at selected altitude and proper speed is maintained.

#### NOTE

**If VNAV is used during a go-around, the airplane will level at the altitudes shown on the LEGS page. Therefore, if following a controller issued / directed missed approach that is different from that on the LEGS page, flight level change is the appropriate pitch mode.**

**If flying the FMC missed approach, the profile should contain the appropriate climb and holding speeds and altitudes. Speed intervention may be required to set the appropriate speed.**

If returning for another approach, flaps may remain in flaps 1 or 5 position.

If a diversion to an alternate airport is required, delay use of VNAV until appropriate FMC entries are completed.

### TAXI & PARKING:

#### SINGLE ENGINE TAXI:

##### OM1 Taxi-Takeoff 10.2 / 3-2-09

Single engine taxi should be utilized as often as possible, conditions permitting. Good judgement and safe operating practices should always prevail.

Single engine taxi is authorized, except:

- On wet or slippery taxiways
- In icing conditions
- Where tight turns in confined areas may be expected.

Single engine taxi may be conducted without the APU operating. Single engine taxi may be accomplished using either engine. Consider the following:

- Effect of jet blast on equipment and personnel
- Direction of turns and length of taxi
- Minimum times for engine warm-up (3 or 5 minutes) and cool-down (1 minute)
- Aircraft weight.

If conditions change making single engine taxi unsafe or impractical, start the other engine or stop the aircraft and request a tow-in. If a significant ground delay is encountered, both engines may be shut down with ATC concurrence.

#### NOTE

During extended ground times, a single bleed source may not be sufficient to cool the cabin effectively. If the APU is required to supplement cooling use the following procedure:

APU ..... START  
BLEED ISLN switch (for the engine running) ..... CLOSED  
[Allows APU bleed air to operate the opposite pack.]

Approximately 5 minutes prior to takeoff:

BLEED ISLN switch (for the engine running)..... AUTO  
Engine .....CROSSBLEED START  
[Starting approximately five minutes prior to takeoff allows time to start, comply with the 3 or 5 minute engine warm-up requirement, and complete the Before Takeoff checklist.]

The following exhaust velocities and distances are provided (these values will vary with air temperature and tire adhesion with the ramp / taxiway surface):

N1	50 MPH	35 MPH
26%	160 ft.	332 ft.
35%	274 ft.	479 ft.
43%	380 ft.	615 ft.
51%	501 ft.	771 ft.
62%	680 ft.	1000 ft.

#### CAUTION

**Use minimum thrust to taxi. Ensure thrust has stabilized prior to making additional throttle inputs to get the airplane rolling. If thrust on one engine exceeds 35% N1, use crossbleed start procedures and taxi on both engines.**

#### MINIMUM RADIUS TURNS:

##### OM 1 After Landing-Parking 10.4 / 8-11-09

If a non-normal or emergency situation requires that a turn be performed on a 147.6 feet (45 m) wide runway or taxi surface, towing is the preferred method. If a tow tug is not available and the turn must be performed, a pivot turn is recommended provided the following conditions are met:

- Due to potentially high structural loads on pavement that is not solid, this method must not be used on a routine basis.
- The pavement surface is sound and free of loose debris.
- The airplane does not exceed maximum landing weight.

If possible, choose the turn direction and location to minimize the potential for engine foreign object damage, jet blast damage and pavement damage during the turn.

Lineup the outside tires of the main landing gear near the outside edge of the edge of the taxi surface or runway. Bring the airplane to a complete stop with engines at idle thrust. If available, use a ground observer to help accurately establish the airplane at the edge of the taxi surface prior to initiating the turn. If an observer is used to guide the lineup, the observer should be well clear of the area before the pivot turn is started.

Turn the tiller to the maximum steering angle and hold maximum steering angle until the nose wheels have cleared the far side of the pavement. Apply full braking pressure to the main gear on the side toward the inside of the turn. The braked landing gear truck must be locked until the nose wheels clear the far edge of the pavement. Apply sufficient thrust to the engine on the outside of the turn to pivot the airplane about the locked gear. The engine on the inside of the turn should remain at idle thrust. If the above method is used, approximately 126.0 feet (38.4 m) of pavement width is required.

NOTE: If the airplane is not initially lined up within approximately one foot of the starting edge of the pavement, or if the inside main wheel brake is not locked throughout the turn, the turn may not be completed within the width of a 147.6 foot (45 m) pavement.

Other considerations include:

- Large tire deflections and rubber trails are normal.
- Inspection of the main gear tires, the nose gear tires, and the pavement surface is recommended after completion of the pivot turn.
- The resulting engine thrust on the outside engine may damage the runway shoulder surface, especially if it is unpaved.
- The nose wheels may produce a scrubbing noise and vibration

on the flight deck.

- Pivot turns on pavements that are not sound may cause pavement damage. In addition, if the pavement fails in such a way as to increase the forces between the pavement surface and the tires, gear and tire design loads may be exceeded with the potential for tire or gear damage.
- Loose debris may result in tire cuts which could lead to premature tire failure.

#### DGS:

##### Checklist for the DGS:

- --If you're unable to determine if gate area is clear, stop and ask for guidemen to guide you to the gate.
- --Proceed cautiously to the gate and be vigilant of ground equipment in the gate area, especially in low visibility. If any ground equipment is not behind the lines, STOP until the area is cleared.
- --If the gate agent is not attending the jet bridge, stop clear of the gate area until someone is available. There are many safety concerns with aircraft at the gate without the jet bridge attended.
- --Verify that the DGS is indicating proper aircraft on DGS monitor.
- --Verify ACARS IN times with DGS IN times.
- --Review Part I, Section 10.

22JUL08/1351

SUBJ: DOCKING GUIDANCE SYSTEM

AS A REMINDER, THE DOCKING GUIDANCE SYSTEM //DGS// ONLY SCANS THE NOSE AND ENGINES OF THE INCOMING AIRCRAFT TO DETERMINE THE AIRCRAFT TYPE. IT DOES NOT SCAN THE GATE AREA FOR OBJECTS THAT MIGHT IMPACT THE JET ON TAXI IN. THE FLIGHT CREW IS STILL RESPONSIBLE FOR ASSURING THAT THE GATE AREA IS CLEAR.

DO NOT SELF PARK UNLESS YOU ARE CERTAIN THAT ALL EQUIPMENT IS BEHIND THE LINES OR IS AUTHORIZED LOW PROFILE EQUIPMENT POSITIONED WITHIN PAINTED BOXES AS NOTED ON THE AIRPORT 10-7 PAGES.

FOR THE FLEET SUPPORT TEAM

CAPTAIN CHUCK HARMAN

OM1 Sec.10, pg. 33 9.5 / 8-20-08:

#### 9.5 Parking Systems

To assist in positioning aircraft at a desired parking location, certain systems are utilized to provide guidance for alignment, clearances, and allow maximum use of service equipment. Wing walkers and guidemen may provide guidance for gates with automated parking systems, however they are not required. Pilots must ensure that all equipment is behind the safety lines. If there is doubt, stop for assistance from ground personnel.

#### FM1 10.8-3 3-15-11

##### 10.8.6 Parking Systems

To assist in positioning aircraft at a desired parking location, certain systems are utilized to provide guidance for alignment, clearances, and allow maximum use of service equipment. Wing walkers and Guidemen may provide guidance for gates with automated parking systems, however they are not required. Pilots must ensure that all equipment is behind the safety lines. If there is doubt, stop and request assistance from ground personnel.

##### 10.8.7 Taxi/Tow Guidance for Flight, Maintenance and Ramp Service

###### A. Clean Ramp Policy

1. Safe taxi / tow operations into or out of the gate are the joint responsibility of the Guideman (if present) and Captain. All ground equipment, including the jetbridge cab and/or passenger stairs, personnel (other than wing walkers) and tow bars, must be positioned outside the ground equipment limit lines painted on the ramp surface and clear of the aircraft fuselage and wing's intended path prior to aircraft taxi or tow into or out of the gate. This policy applies to all stations with or without a docking guidance system.

2. If obstacles are observed within the ground equipment limit lines, stop the aircraft immediately and request the specific items be removed. This policy applies whether the aircraft is being taxied or towed into the gate. If the ground equipment limit lines are not visible because of night or inclement weather conditions, stop the aircraft and call for a Guideman and wing walkers. Follow the Guideman's signals. If any doubt exists regarding obstacle clearance, stop the taxi or tow operation and attempt to communicate the discrepancy to the Guideman by any appropriate means.

###### B. Exceptions to Clean Ramp Policy

1. Wheel Chocks - On arrival, chocks may only be placed abeam, but clear of the nose tire on the Captain's side of the aircraft and used as a guide for parking the aircraft. However, when not in use, chocks should be placed outside the ground equipment limit lines in an approved area or in the storage rack if available.
2. KLAX - The field condition report (FCR) describes a waiver to the Clean Ramp Policy for KLAX. In particular, the FCR will specifically state, widebody cargo loaders without cargo (Approximately 11 ft. high) and smaller equipment may be parked in designated areas within ground equipment limit lines on the ramp. These designated areas may place the loader beneath the wings of wide body aircraft. No other large equipment is allowed.
3. Items in Painted Boxes - Any other exception to this policy such as a low profile fuel station will be noted on the station field report and must be positioned within a painted box.

###### C. Guideman Responsibilities

1. Ensure all ground equipment (except as noted in paragraph B.)

is placed behind ground equipment limit lines.

2. The Guideman, not the pilot, is responsible for ensuring the proper number of ground handling personnel are in place and properly equipped (dayglo / lighted wands, vests, eye / hearing protection, etc.)

3. Employ only standard authorized ramp signals as illustrated in the Line Cargo Manual and reproduced in Flight Manual Part I, Chapter 5.

4. Maintain visual contact with the Captain throughout arrival and direct the aircraft to the final parking spot.

##### D. Captain Responsibilities

1. Align aircraft on appropriate lead-in line.

2. Visually ensure that ground equipment or vehicles are behind the ground equipment limit lines. If the station does not have clearly painted ground equipment limit lines, exercise caution and proceed via the Guidemen's signals.

3. After checking that gate area is clear, Captain shall call "Clear Left" and First Officer shall call out "Clear Right"

4. A Guideman is always required unless an automatic parking system is installed and in use for your flight. Follow Guideman directions to the parking spot.

5. After Ground crew gives "Chocks In Sign", Captain will respond with "Chocks in Signal".

##### ENGINE COOL-DOWN PERIOD:

OM1 After Landing – Parking 15.4 / 11—8-09

Engine(s) may be shut down after one minute of operation at taxi power.

##### DUAL POWER SOURCES:

OM 1 After Landing-Parking 15.3 / 8-11-09

While parked at the gate, the use of two sources of electrical Power is recommended to reduce the potential heat build-up on the contactors and electrical panel.

This recommendation can be met with the following configurations:

- **PRIMARY and SECONDARY** External Power (most cost-efficient configuration but may not be available at all airports)
  - Sufficient PCA cooling must be connected.
- **PRIMARY External Power and APU Power**
  - The APU shares electrics with external power and provides cooling.

##### APU POWER TRANSFER AFTER SHUTDOWN:

OM1 After Landing – Parking 15.4 / 8-11-09

*Technique: If ground power faults and drops off line repeatedly, try selecting Primary only. Contact Maintenance, Ramp or Ops.*

##### Electrical Power Transfer - APU to External Power

An electrical anomaly has been observed during some 777 flight tests. When switching from APU to external power, the MFD

formats change to the default displays (i.e., map on inboard displays and blank on the lower center display).

All equipment is designed to function properly even when a "break" power transfer occurs. When a long break occurs (up to 0.2 seconds), the display changes described above will occur. This long break, while causing some additional crew workload, does not impact functionality or reliability of the airplane equipment. The cause of the long breaks is related to electrical loading conditions on the airplane.

If the MFD formats change to the default displays, the desired displays can be re-established by re-selecting the appropriate displays. To help avoid the undesirable effect of "long break" power transfers when transferring from APU to external power, use the following steps:

Primary External Power AVAIL Light.....CHECK ILLUMINATED  
Primary External Power Switch ..... PRESS

☐ If Secondary External Power AVAIL Light is illuminated:

Secondary External Power Switch..... PRESS

Note: External Power Fluctuations

Email 11-24-09 from Bruce Moore, B777 GS Instructor

*We have occasional problems connecting external electrical when both Primary and Secondary Power are Available and selected, because the aircraft will reject all external power when the total voltage is less than 180 KVA (Note - DFW had 140 KVA via both plugs combined, and we couldn't establish external power until we removed one ground power plug and then selected only one external power source). "Removed" may be the wrong term. It was when we tried to select both power sources that we had the problem. When selecting only one external power source with one plug only, there was no problem because 90 total KVA was then available, versus only 70 from each individual plug when both external sources were selected. Our computer airplane keeps a lot of secrets.*

PCA:

OM1 After Landing – Parking 15.4 / 8-11-09

Use of External Power / APU / External Pre-Conditioned Air

The Changeover Report includes information related to the availability of external power and Pre-Conditioned Air (PCA) at the assigned gate.

If the gate assignment on the Changeover Report (ACARS or voice) is not accompanied by any further information, both external power and PCA will be available at the gate.

If external power or PCA will not be available at the assigned gate, one of the following messages associated with the gate will be included on the Changeover Report:

- NO EXT PWR
- NO EXT PWR / NO PCA

- NO PCA

#### NOTES

- It is recommended that PCA be used, when available, instead of the APU and A/C packs. This reduces the heat input from the A/C packs into the center wing fuel tank area, as well as, fuel consumption and APU usage.
- For extended gate holds, consider shutting down both engines. The APU will supply sufficient electrical and cooling at reduced fuel consumption. Coordinate with controlling agency (Ground, Tower, or Ramp), prior to shutdown.
- On through flights with short ground times or for other specific conditions (e.g., high surface winds), ground personnel may decide not to connect external power / PCA. In such cases, the crew is advised to start the APU by receiving the NO EXT PWR / NO PCA message on the Changeover Report.

#### PARKING CHECKLIST:

OM1 After Landing Parking 15.2 / 11-1-07

FLIGHT DIRECTOR SWITCHES .....OFF  
OIL / O2 / HYD / STATUS MESSAGES ..... CHECKED

- Check engine oil quantities.

Request servicing for any engine that contains less than 18 quarts.

Notify Maintenance and make a numbered entry in the E6.

- Select STATUS on MFD and check oxygen / hydraulic quantities.

- Record all STATUS messages in the E6.

#### NOTE:

Disregard the EICAS alert and status messages displayed during the PFC self test after hydraulic shutdown. Wait approximately 3 minutes after HYD PRESS SYS L+C+R message is shown before recording status and recording status and alert messages in E6.

POSTFLIGHT REPORT and DELAY CODES.....COMPLETED

NOTE: If SATCOM link is required, ADIRU must be aligned.

#### POST FLIGHT REPORT:

OM 1 After Landing-Parking 15.5 / 8-11-09

Post-Flight Report

After gate arrival and when the first passenger door opens, a COMM message displays indicating the POSTFLIGHT page has been automatically generated. To display the POSTFLIGHT page, press the COMM button on the Display Select Panel. The IN fuel is automatically entered for the ARR FUEL. Enter additional information as required, i.e., LNDG CREDIT, RVR, AUTOLAND, ARR RWY, BRK ACTN, and DEPT RWY. Press the SEND button to send the report or let the report send automatically after two minutes.

#### NOTE

Do not select the POSTFLIGHT page prior to the first passenger door opening. If the POSTFLIGHT page is selected prior to the first passenger door opening, an additional POSTFLIGHT page will be created. This additional POSTFLIGHT page will not prevent the automatic POSTFLIGHT page from generating when the first passenger door is opened, and both POSTFLIGHT reports must be sent.

#### DIVERSION REPORT:

OM1 SYSTEMS 35.15/ 10-25-10

Summary of MISC (Miscellaneous) Codes

58 – Reporting Aircraft On-Ground Status During Diversions

Sending a MISC 58 assists SOC in tracking status of diverted flights during off schedule operations (OSO).

#### NOTE:

The MISC 58 code does not replace direct Communications between the flight and the diversion station to coordinate servicing requirements. The MISC 58 advises SOC of the flight status. Approximately 30 minutes after landing, an ACARS message will be sent automatically to the diverted flight requesting the crew transmit MISC 58 messages as the status changes.

#### Message

CAPTAIN, PLEASE SEND A MISC 58 WITH YOUR DIVERSION STATUS AS SOON AS POSSIBLE.

If not updated status messages are received by approximately 2 hours after landing, another ACARS request will be transmitted automatically.

#### ELECTRICAL POWER DOWN:

OM 1 After Landing-Parking 15.3 / 8-11-09

The following procedure is accomplished to remove all electrical power from the airplane.

Verify:

ADIRU .....OFF

Emergency

Lights .....OFF

Battery

Switch .....OFF

HYD PRESS SYS L+C+R Message.....DISPLAYED

Then accomplish the following steps:

Pack Switches .....OFF

APU Selector and/or External Power Switch(es)...OFF

COCKPIT VOICE RECORDER:

QRH Non-Normals Preface, p.9 / 12-8-03

FAR 121.359 (a) states that "the cockpit voice recorder must operate continuously from the start of the use of the checklist

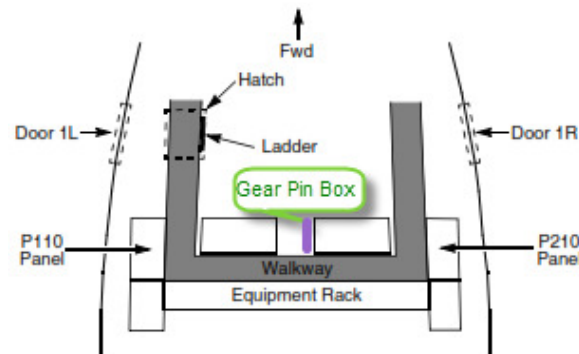
(before starting engines for the purpose of flight) to completion of the final checklist at the termination of the flight.”

The Cockpit Voice Recorder c-b (located in the E&E compartment on the P110 panel at F6 and labeled VOX RCDR) is pulled after landing following any of these occurrences:

- Airplane accident
- Flight control system malfunction
- Incapacitated flight crewmember as result of injury or illness
- Failure of structural components of a turbine engine excluding compressor and turbine blades and vanes
- Inflight fire
- Inflight collision
- Damage to property other than the aircraft estimated to exceed \$25,000
- Inflight failure of electrical systems which requires the sustained use of an emergency bus powered by a backup source such as a battery, APU, or RAT to retain flight control or essential instrument.
- Inflight failure of hydraulic system that results in sustained reliance on the sole remaining hydraulic or mechanical system for movement of flight control surfaces.
- Sustained loss of the power on both engines
- Ground evacuation  
Delay pulling the Cockpit Voice Recorder c-b until after the evacuation and conditions are safe to re-enter the airplane.
- Hijacking.  
Upon landing at a hijacker's destination, the Cockpit Voice Recorder c-b is pulled and is to remain pulled during the return flight to the United States or to a base where the recorder may be removed for readout.

Deactivate the Cockpit Voice Recorder as follows:

- If AA Maintenance personnel are available, make a numbered E6 write-up to have the cockpit voice recorder circuit breaker pulled.
- If AA Maintenance personnel are not available, a cockpit crew member may enter the E&E compartment after all passengers have deplaned and pull the c-b (refer to UNANNUNCIATED CHECKLISTS – SMOKE / FUMES / FIRE ELEC – Supplemental Information for instructions on how to enter E&E compartment). Make a numbered Info to Maintenance E6 write-up that the cockpit voice recorder circuit breaker has been pulled.



NOTES:

**WARNING:** The proper and continuously updated sources for all flights are the Flight Manual Part I and II, and aircraft Operating Manuals.

**NOT AN OFFICIAL DOCUMENT - PERSONAL REFERENCE ONLY**

Email: [info@777cheatsheets.co](mailto:info@777cheatsheets.co)  
Available on line: <http://www.777cheatsheets.com>

# **GSE SAFETY ADVISORY**

**GSE 2008-05**

**DATE 5/9/2008**

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## **Aircraft Water Service**

There have been over 800 departure delays incurred since January, 2007 due to leaky coffee makers and flooded galleys. Water leaks not only cause delays they can create a safety hazard for flight crews, ground service personnel, and passengers.

- An over-pressure condition can occur while the potable water is being serviced. The water may enter the aircraft faster than it is able to exit through the overfill port.
- The resulting pressure in the potable water system becomes too high causing the coffee maker pressure relief valve to unseat.
- Delays occur when coffee maker leaks and toilets overflow just prior to departure.
- When a coffee maker leaks it flows into the drain mast system or garbage cans and can overfill them.
- Once a leak develops the aircraft can drain the entire potable water system.

When servicing the aircraft potable water system, Ramp Service should:

- Turn off the water immediately after the water begins flowing out the over-fill port.
- When servicing the potable water, leave the overfill vent and fill line open until all the pressure exits the system and water is no longer exiting the overfill port.

### **Action Required**

1. GSE/Facilities Maintenance shall lower the service pressure in the water cabinets and water trucks to **40 PSI**. Compliance with this Advisory is Mandatory and must be accomplished before June 1, 2008.
2. Report compliance with water pressure adjustment in DataStream.

**David Terrell**  
**Mgr, Facilities**

**Gary Bird**  
**Mgr, GSE**



## E-6 LOGBOOK ENTRY GUIDE

### Logbook Entry Responsibility

1. The Captain is responsible for all flight crewmember entries in the E6 logbook. The Captain may delegate writing entries in the E6 logbook, but no entry may be made without the Captain's prior knowledge and approval. All discrepancies discovered during flight will be entered by the inbound flight crew. All discrepancies discovered by the flight crew during preflight will be entered in the E6 logbook by the flight crew as soon as possible. The Captain must sign and enter his/her employee number after the last entry signifying review and approval of all entries. All entries will be made in blue or black ink.

2. Discrepancies discovered by persons other than flight crews will be entered in the E6 logbook by a mechanic. Discrepancies discovered by mechanics during scheduled maintenance checks, e.g. A, B, or C checks, are not normally entered in the E6 logbook. If there are open items from the scheduled check they will be entered as separate entries in the E6 logbook. AA mechanics will sign all their entries followed by their employee number; contract maintenance personnel will sign and enter their pseudo AA employee number or appropriate certificate number as per GPM 05-04.

### Logbook Entry Numbering

1. Discrepancies discovered during flight will be entered using the inbound flight number.

2. Discrepancies discovered during preflight by the flight crew will be entered using the outbound flight number.

3. Discrepancies discovered by maintenance personnel will be entered using flight number 9999 which is for MEL expiration tracking.

4. All mechanical discrepancies must be numbered using numbers 1-99 sequentially, including **"Info to Maintenance"** entries. The following entries are not numbered:

- No Items
- Flight Crew Info
- Info Only
- Aircraft Security

Repetitive checks due to an MEL placard are entered with an XX in the discrepancy number box.

5. The preferred method would be that each mechanical discrepancy be entered and numbered separately; multiple discrepancies under one number are not allowed except for multiple like items with the same discrepancy at several locations in the cabin. i.e. "Seat tray tables at row 17A, 19B, and 23C do not stay up and locked" or "No Smoking lights at row 5AB, 6DFF, and 7AB are inop". The GPM restricts multiple seats from being grouped in one write-up if the whole seat is inoperative.



# E-6 LOGBOOK ENTRY GUIDE

## Discrepancy Text Guidance

For each of the items listed below, as a minimum, maintenance has requested that the logbook entry include the information listed below. In addition, the flight crew may include any information that is pertinent and helpful to diagnosing a mechanical problem. If the item is a repeat write-up, please note this in the text and reference the relevant PIREP numbers.

### 1. Engine Start Problems

- A. Hung start:
  - 1) N2 (N3 Rolls R.)/fuel flow/EGT/duct pressure.
- B. Slow spool up to idle:
  - 1) Duct pressure/fuel flow.
- C. Low idle:
  - 1) Compare idle N2 (N3 Rolls R.)/fuel flow with other engine.

### 2. Engine Problems (On Ground or In-flight)

**Note:** In flight, note phase of flight, N1 and EPR (as applicable), FF, EGT and Engine Anti-ice on or off.

- A. Slow acceleration:
  - 1) Compare idle N2 (N3 Rolls R.)/fuel flow/time to accelerate
- B. Throttle stagger:
  - 1) Relative position of throttles.
  - 2) EPR, N1/N2/N3 (as applicable)
- C. Commanded or uncommanded shutdown?
- D. Single engine time.
- E. Oil pressure/temperature/quantity indications.
- F. Were there any vibrations felt or indicated?
- G. Was there a compressor stall either heard or felt?
- H. N2/N3 speed indicated (as applicable)

### 3. Autopilot Discrepancies

- A. Autopilot mode selected when fault occurred?
- B. Did the autopilot auto-disconnect?
- C. Was autoland selected when the fault occurred?

### 4. Hydraulic Problems

- A. Hydraulic pressure/quantity indications.
- B. Engine driven pumps – high/low/off?
- C. Electric hydraulic pumps – high/low/off?

### 5. Flight Control Problems

- A. Autopilot on or off?
- B. Flap position indicated VS. flap handle position.
- C. Rudder trim position.
- D. Aileron trim position.

### 6. Smoke or Fumes


- A. Packs auto or off?
- B. Anti-ice on or off?
- C. Galley power/ovens on or off?
- D. IFE on or off?
- E. Odor or visible smoke?
- F. Area of cabin affected or cockpit only?
- G. Engine bleed configuration.

### 7. APU Problems

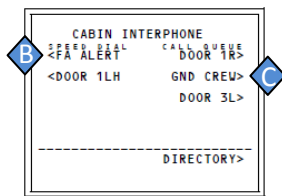
- A. Start sequence – fail to start
  - 1) Was there rotation indicated?
  - 2) Was there an EGT rise?
  - 3) Was there a battery voltage drop?
- B. Post-start sequence problems
  - 1) Was APU bleed air available?
  - 2) Was APU electrical power available?
  - 3) Was there an odor after start?

**55 = 4 Chime Priority**

**53 = 2 Chime Priority (All Positions & Bunks)**



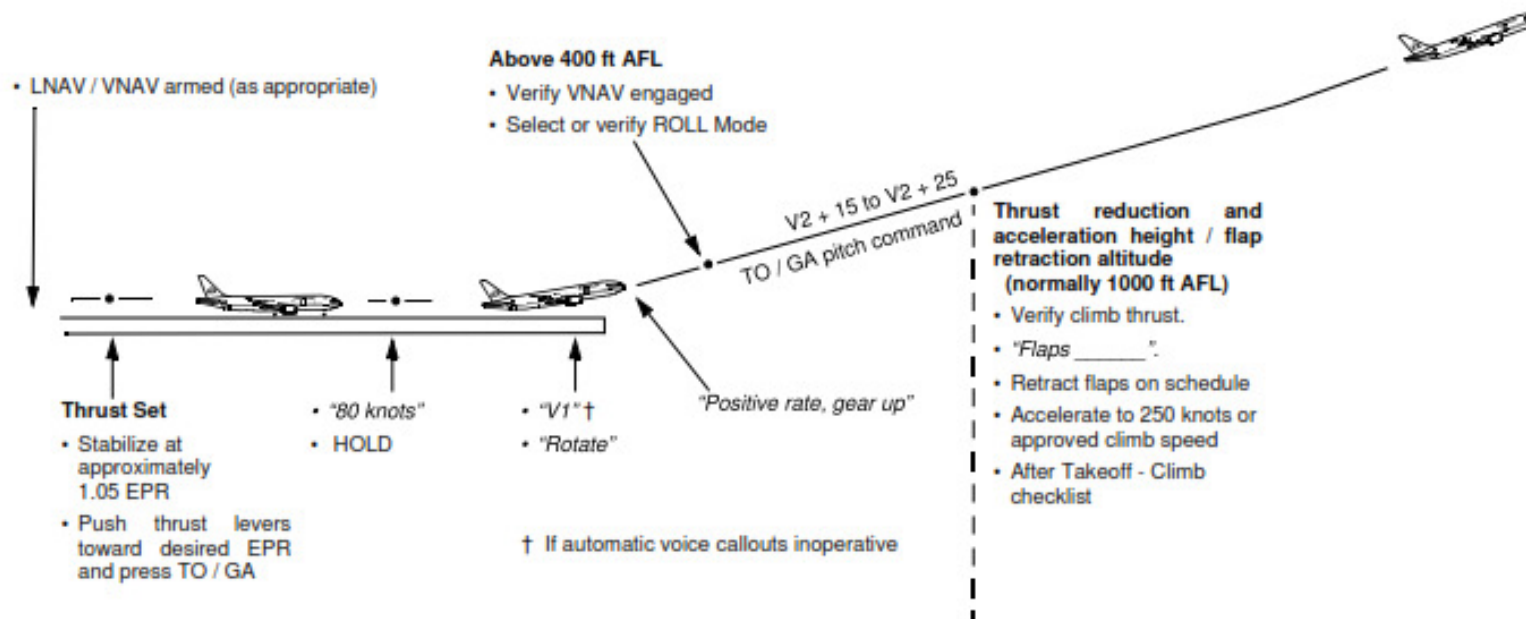
CABIN INTERPHONE  
 <PA FIRST  
 <PA BUSINES  
 <PA COACH  
 <PA ALL  
 <PA PRIORITY  
 <SEND CAB INT>



- Revised 3/30/10 / Mark Holstius

**Normal Takeoff Profile (NADP 2 or ICAO B Compliant)**

This Noise Abatement Departure Procedure (NADP) is the standard to be used unless directed otherwise by FM Part II and provides noise reduction to areas distant from the runway end.

**NOTES**

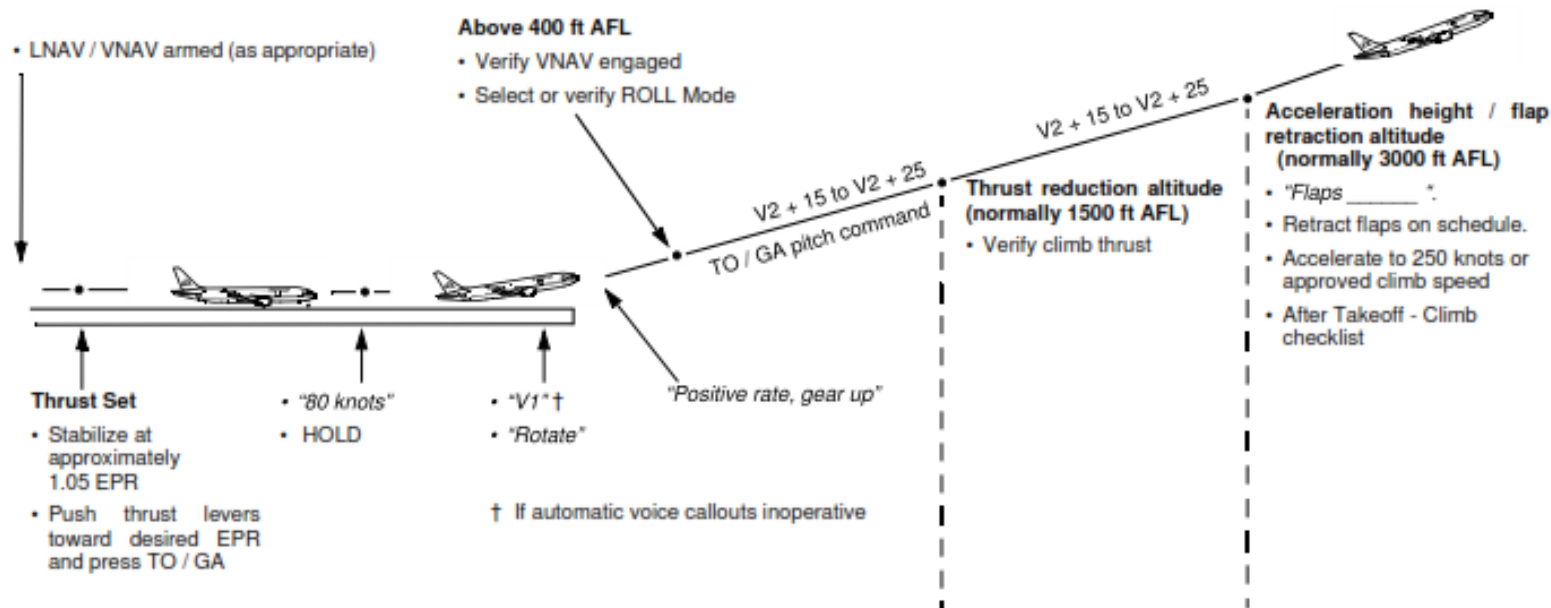
- NADP 2 supersedes ICAO B procedures, although some reference to the latter still exists in various publications.
- If required, manually select CLB on the THRUST LIM page to increase climb performance e.g., altitude climb restrictions, terrain considerations.
- Verify or select thrust reduction and acceleration height altitudes on the TAKEOFF REF 2/2 to appropriate altitude if different than default.

## 20.4 TAXI - TAKEOFF

10-25-10

### Noise Abatement Takeoff Profile (NADP 1 or ICAO A Compliant)

This Noise Abatement Departure Procedure (NADP) is to be used only when directed by FM Part II and provides noise reduction for noise sensitive areas in close proximity to the departure end of the runway.

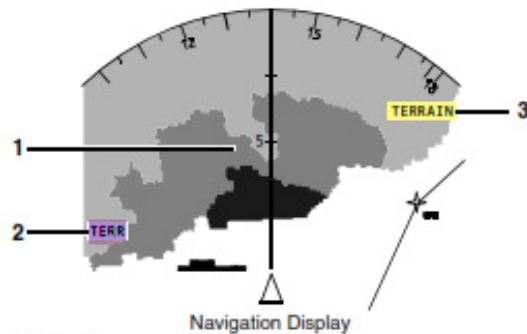


### NOTES

- NADP 1 supersedes ICAO A procedures, although some reference to the latter still exists in various publications.
- If required, manually select CLB on the THRUST LIM page to increase climb performance e.g., altitude climb restrictions, terrain considerations.
- Verify or select thrust reduction and acceleration height altitudes on the TAKEOFF REF 2/2 to appropriate altitude if different than default.

# GPWS

## Terrain Display



### 1. Terrain Display

Color and density vary based on terrain height versus airplane altitude:

- Dotted green: terrain from 2000 feet below to 500 feet (250 feet with gear down) below airplane altitude
- Dotted amber: terrain 500 feet (250 feet with gear down) below to 2000 feet above airplane altitude
- Dotted red: terrain more than 2000 feet above airplane altitude
- Dotted magenta: no terrain data available
- Solid amber: look-ahead terrain caution active
- Solid red: look-ahead terrain warning active.

#### NOTES

- In areas without terrain data, look-ahead terrain alerting and display functions not available. GPWS immediate alerts function normally.
- Terrain more than 2000 feet below airplane altitude or within 400 feet of nearest airport runway elevation is not displayed.

Displayed automatically when:

- A look-ahead terrain alert occurs, and
- TERR not selected on either ND, and
- Respective ND is in MAP, MAP CTR, VOR, or APP mode.

Display updates with a display sweep similar to weather radar display.

### 2. Terrain Mode Annunciation

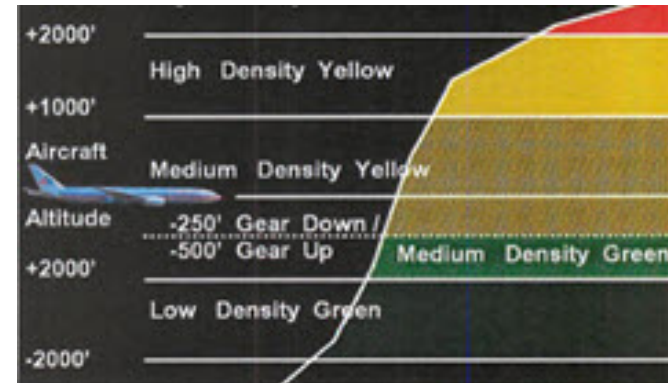
TERR (Cyan) – Terrain display enabled.

### 3. TERRAIN Annunciation

TERRAIN (Amber) – Look-ahead terrain caution alert is occurring.

TERRAIN (Red) – Look-ahead terrain warning alert is occurring.

Displayed in all navigation display modes.



## GPWS Look-Ahead Terrain Alerts

Voice Annunciation	PFD and ND Display and Light	Description
TERRAIN TERRAIN PULL UP	Red PULL UP message on both PFDs Master WARNING Lights Red TERRAIN message on both NDs Solid red terrain on ND	20 to 30 seconds from projected impact with terrain. Pressing the GND PROX TERR OVRD Switch to OVRD inhibits the alert.
CAUTION TERRAIN	Amber TERRAIN message on both NDs Solid amber terrain on ND GND PROX Light	40 to 60 seconds from projected impact with terrain. Pressing the GND PROX TERR OVRD Switch to OVRD inhibits the alert.
TOO LOW, TERRAIN	GND PROX Light	Descent below unsafe altitude while too far from any airport in the terrain database. Pressing the GND PROX TERR OVRD Switch to OVRD inhibits the alert.

### 11.3.4 Public Address Messages in Non-Routine Situation

A. In All Cases — Tell The Truth

D. Turbulence:

#### 1. Expected:

a) "Ladies and Gentlemen, this is Captain \_\_\_\_\_ speaking. I have instructed the Flight Attendants to take their seats and fasten their seat belts due to some turbulent air. Please ensure that your seat belts are properly fastened. There is no cause for alarm. We simply want you to be aware that there may be a few bumps ahead. We will make every effort to minimize any effects we may encounter. Thank you for your cooperation."

b) If the seat belt sign is left on for an extended period, occasionally re-emphasize the importance of seat belt use.

#### 2. In Progress or Imminent / No Warning.

##### a) "Flight Attendants be seated immediately."

b) Refer to Chapter 12, Turbulence Procedure, for flight attendant response.

#### 3. Limited Warning.

##### a) "Flight Attendants, stow carts and take your seats."

b) Refer to Chapter 12, Turbulence Procedure, for flight attendant response.

### FM1 12.4-3 / 3-15-11

#### 12.4.4 Turbulence Procedure

A. The perceived severity of turbulence differs greatly between the cockpit and cabin. If turbulence is unavoidable, timely notification of Flight Attendants is necessary so they can check passenger compliance with the seat belt sign, stow service carts, take their seats, and fasten their seat belts.

B. On all flights, Captains must use the PA, interphone, and seat belt sign as necessary to notify passengers and Flight Attendants. Do not rely on seat belt signs alone. In some instances, it may be more appropriate to use the interphone to communicate with the Flight Attendants rather than make a PA. When it is necessary for Flight Attendants to be seated with seat belts fastened, the Captain should convey this information to the passengers.

Captains should, at their discretion, make other cautionary PAs they deem necessary.

C. Turbulence is the leading cause of injury to F/As and passengers. In order to help prevent injuries to our passengers and crew the following paragraphs establish standard verbiage and procedures for turbulence encounters. Turbulence guidelines and associated cockpit and F/A procedures are divided into three categories:

1. In Progress or Imminent / No Warning – The aircraft is experiencing significant turbulence or turbulence is imminent with little or no warning.

2. Limited Warning – The cockpit has limited time to notify F/As that turbulence is about to occur.

3. Expected – The cockpit has increased warning time, e.g. forecast conditions or PIREPs.

#### D. Turbulence in Progress or Imminent / No Warning

This category addresses sudden, unexpected or imminent turbulence; F/As and passengers are to protect themselves immediately.

##### 1. Cockpit Actions:

a) Seat belt sign "ON" followed by the PA, "Flight Attendants be seated immediately."

b) When conditions permit, make the following PA, "Ladies and gentlemen please remain seated. Flight Attendants, you may resume your normal in-flight duties."

##### 2. F/A Actions:

a) Take first available seat, including passenger seat, and fasten seatbelt.

b) First F/A in jumpseat, make PA advising passengers to take any open seat.

c) Do not stow carts. Secure hot liquids and loose items if possible.

d) Do not perform compliance checks.

e) Remain seated until cleared by the Captain.

f) Once cleared to resume duties, assess injuries or damage and report to cockpit.

### E. Limited Warning of Turbulence

This category addresses situations where in the Captain's judgement there is enough time to seat the passengers, perform a compliance check, stow the service carts, and seat the F/As in their jumpseats.

#### 1. Cockpit Actions:

a) Seat belt sign "ON" followed by the PA, "Flight Attendants, stow carts and take your seats."

b) Coordinate with flight attendants to ensure that conditions in the cabin permit resumption of F/A duties. If conditions permit, allow the flight attendants to resume their duties by making the following PA, "Ladies and gentlemen please remain seated. Flight Attendants, you may resume your normal in-flight duties."

#### 2. F/A Actions:

a) F/A 1/ Purser make PA advising passengers to take seats and fasten seat belts.

b) Immediately stow all carts, perform compliance check, take jumpseats and fasten harnesses.

c) F/A 1/ Purser advise cockpit when all carts are stowed, compliance checks complete and all F/As secured in their jumpseats.

d) Remain seated until cleared by the Captain.

e) Once cleared to resume duties, assess injuries or damage and report to cockpit.

### F. Expected Turbulence

This category addresses situations where there is enough advance notice for the Captain to give the flight attendants a thorough turbulence briefing either before flight or by interphone. The Captain should address the following points in the briefing:

a) The expected turbulence level and the actions to be taken.

b) The F/As should advise the cockpit when these actions are accomplished.

c) How the cockpit will inform the F/As if the turbulence is worse or occurs sooner than expected. Differentiate between the above PAs and when they would be used.

d) Encourage the F/As to communicate cabin ride conditions to the cockpit using plain-language descriptions.

e) The expected duration of the turbulence and how the F/As will be released to resume normal duties.

**10.2 NON-ILS APPROACHES****10.2.1 Visual Approaches**

Reference: Ops Spec C077

- A. A Visual Approach is an approach wherein aircraft on an IFR flight plan, may proceed to the destination airport in VFR conditions with the authorization of the controlling ATC facility.
- B. AA Ops Specs state that the flightcrew may accept a visual approach provided all the following conditions exist:
  1. The flight is operated and remains in Class B, C, or D airspace, within 35 miles of the destination airport in Class E airspace, or the airspace below a designated transition area.
  2. The flight is under control of an ATC facility.
  3. VFR weather conditions. (For charted visual approaches, weather must be reported at or above the minimums established for charted visual approach procedure.)
  4. For a visual approach that is not charted - the flightcrew must be able to establish and maintain visual contact with the airport or maintain visual contact with the traffic to be followed as instructed by ATC.
  5. For a charted visual approach - the flightcrew must be able to establish and maintain visual contact with the airport or charted visual landmarks. Further, charted visual approaches, or visual segments, may be flown day or night as depicted on the approach plate with reference to FMS waypoints, visual landmarks, and/or lead-in lights as appropriate.
- C. By accepting a visual approach, the flight crew assumes responsibility for terrain and obstacle clearance, and landing at the correct runway. If the flight crew has the airport in sight but cannot see the aircraft to be followed, ATC may clear the aircraft for a visual approach, however, ATC retains separation responsibility. When visually following a preceding aircraft, acceptance of a visual approach constitutes acceptance of flight crew responsibility for maintaining a safe approach interval and adequate wake turbulence separation. (AIM)
- D. At night, since obstacles may not be visible, visual approaches must not be accepted or requested unless the airport is clearly in sight and the flightcrew is certain of remaining clear of obstacles and terrain while maneuvering for landing.
- E. A visual approach is not an Instrument Approach Procedure and therefore has no missed approach segment. If a go around is necessary for any reason, aircraft operating at controlled airports will be issued an appropriate advisory/clearance/instruction by the tower. At uncontrolled airports, aircraft are expected to remain clear of clouds and contact ATC as soon as possible for further

clearance. Separation from other IFR aircraft will be maintained under these circumstances. (AIM)

**10.2.2 Look-See Approach**

- A. Look-See approaches are NOT authorized.
- B. A Look-See is an approach initiated with the knowledge that the reported weather conditions are less than required for the approach, but with the hope that required visual cues will be acquired before reaching minimums.

**10.2.3 Contact Approach**

- A. Contact Approaches are NOT authorized
- B. A contact approach is a special instrument procedure approved for individual operators and requested by the aircrew in which an IFR clearance is retained but avoidance of obstructions and separation from VFR traffic become the pilot responsibility.

**10.2.4 Surveillance Approach (ASR / SRA / SRE)**

- A. Surveillance Radar approaches are NOT authorized, except in emergencies.
- B. A Surveillance Approach is a nonprecision radar controlled approach. Azimuth and distance information are provided by the radar controller. The pilot will be advised when to commence descent to the MDA. In addition, the pilot will be advised of the location of the missed approach point and the aircraft distance from the runway in miles. If requested by the pilot, recommended altitudes (MSL) will be issued at each mile. Navigational guidance will be provided until the aircraft reaches the MAP. Controllers will terminate guidance and instruct the pilot to execute a missed approach if the runway is not in sight at the MAP. Guidance may be terminated upon pilot request or by the controller when the pilot reports the runway in sight.

**10.2.5 Precision Approach Radar (PAR)**

- A. Precision Approach Radar approaches are NOT authorized, except in emergencies.
- B. Precision Approach Radar detects and displays azimuth, elevation, and range of the aircraft on the final approach course to a runway. This equipment may be used to monitor certain nonradar approaches but is primarily used to conduct a precision instrument approach wherein the controller issues guidance instructions to the pilot based on azimuth, elevation, and range to the touchdown point.

**10.2.6 VOR / NDB Approach**

VOR and NDB approaches may be flown in map mode or with raw data. Refer to the aircraft operating manual for raw data monitoring requirements

**10.2.7 RNAV (GPS) Approach**

Reference: Ops Spec C052

RNAV (GPS), RNAV (GNSS), or GPS approaches are authorized for 737, 777, Pegasus-equipped 757/767, and GFMS-equipped DC-9 aircraft. Refer to Operating Manuals for specific approach procedures and guidance.

**10.2.8 RNAV (RNP) Approach**

Reference: Ops Spec C358, C384

- A. RNAV(RNP)/SAAAR or RNAV(RNP) AR (ICAO) approaches are authorized for 737, 777, and Pegasus-equipped 757/767 aircraft. Refer to Operating Manuals for specific approach procedures and guidance.
- B. Only those specific RNAV(RNP) approaches validated by the Flight Operations Department are approved for use. Approved procedures will be indicated in Flight Manual Part II, on 10-7 or XX-7 pages. Newly published approaches that are not yet approved or previously approved approaches that later fail validation and become unapproved, will be identified in F4 or J8 messages for the applicable airport.

**10.2.9 RNAV "Alternate" Approach**

Reference: AIM 1-2-3

- A. An RNAV Alternate approach is used when the ground-based NAVAID defining the approach is operational. The approach is flown by selecting a published NDB, NDB/DME, VOR, or VOR/DME approach in the FMS and using the FMS as the primary flight director guidance for the approach. Raw data may be monitored during the approach. Refer to the operating manual for specific approach procedures and guidance, and for raw data monitoring requirements.
- B. Restrictions:
  1. The appropriate ground-based NAVAID defining the approach must be operational.
  2. The aircraft must be equipped with operational navigation equipment compatible with the ground based NAVAID.
  3. If the NAVAID becomes unusable during the approach, a missed approach must be executed unless able to remain in VMC and proceed to the runway using visual references.
  4. The approach must be selected from the FMC database with no modifications of waypoints allowed.
  5. Alternate procedures may not be used for lateral navigation on any localizer-based final approach course without reference to raw localizer data.



#### 10.2.10 RNAV "Substitute" Approach

Reference: Ops Spec C300

- A. An RNAV Substitute approach is used when the ground-based NAVAID defining the approach is not available because the reference NAVAID is out of service or the aircraft NAVAID receiver is not installed or placarded. The approach is flown by selecting a published NDB, NDB/DME, VOR, or VOR/DME approach in the FMS and using the FMS as the primary flight director guidance for the approach. Monitoring raw data is not possible. Refer to the operating manual for specific approach procedures and guidance.
- B. Restrictions:
1. Only published NDB, NDB/DME, VOR, or VOR/DME approaches that have been validated by Flight Operations for a specific fleet are authorized to be conducted using RNAV substitute procedures. Approval for a specific fleet and approach will be indicated by flight plan message.
  2. Operational GPS position input is required.
  3. A prediction of RAIM availability must be checked and found satisfactory during flight planning and RAIM must be available during the RNAV substitute approach.
  4. If the underlying approach is "Not Authorized" by NOTAM a substitute approach cannot be conducted because of possible obstacle issues.
  5. The approach must be selected from the FMC database with no modifications of waypoints allowed.
  6. The flight crew must ensure the required navigation system accuracy for each flight segment is satisfied. (ANP not more than RNP of the reference approach.)
  7. Inside the final approach segment, if ANP exceeds RNP or any alert indicates loss of system accuracy, a missed approach must be executed unless able to remain in VMC and proceed to the runway using visual references.
  8. Substitute procedures may not be used for lateral navigation on any localizer-based final approach course.
  9. Substitute approaches may not be used for planning purposes at an alternate airport.



#### 10.3.3 Category I Approaches

Reference: Ops Spec C074

- A. A Category I instrument approach is any authorized precision or non-precision instrument approach which is conducted with a minimum height for IFR flight not less than 200 feet (60 meters) above the touchdown zone and a minimum visibility / RVV not less than ½ statute mile or RVR1800.
- B. If minimums are based on RVR, High Intensity Runway Edge Lights are required for both nighttime and daytime approaches. (AC150/5300-13)
- C. If the approach is based on RVR, Touchdown Zone RVR is controlling, except that Mid RVR may be substituted if Touchdown Zone RVR is unavailable. Mid and rollout RVRs are not required, and if given, are advisory.
- D. CAT I approaches with minimums noted as "Special Aircrew and Acft Authorization Required" must be flown using a flight director, coupled autopilot or HUD until Decision Altitude or initiation of missed approach unless adequate visual references with the runway environment are established which allow safe continuation to a landing.
- E. CAT I ILS approaches with charted minimums as low as RVR 1800 are authorized to runways without or with inoperative touchdown zone (TDZ) and/or centerline lights (CL). The approach must be flown using a flight director, coupled autopilot or HUD until Decision Altitude or initiation of missed approach unless adequate visual references with the runway environment are established which allow safe continuation to a landing. Without adequate visual references, should the FD, AP or HUD malfunction or be disengaged during the approach, the flight crew must execute a missed approach.
- F. If the pilot flying the approach has both flight director and the autopilot coupler inoperative or they are not used, the DA(H) must be no less than 250 feet HAT, and the RVR / visibility be no less than 2400 feet (750m) ½ mile.
- G. For Restricted Captain approach requirements and a discussion of FAA Exemption 5549 (Refer to Restricted Captains in Chapter 4.).



#### 10.3.4 Category II Approaches

Reference: Ops Spec C059

- A. Published Category II ILS approaches may be conducted when the reported RVR is less than 1800 RVR, subject to the following restrictions:
1. TDZ RVR is controlling. Rollout, is advisory only. Mid or Far-End RVR may substitute for Rollout RVR.
  2. RVR 1600 feet (500 meters) - Lowest authorized minimum if only a TDZ transmissometer RVR report is available.
  3. RVR 1200 feet (350 meters) - Lowest authorized minimum if both TDZ and Rollout reports are available.
  4. Canada 1200 RVR minimums - To start the approach, Canadian regulations require a TDZ report of 1200 RVR and a midfield report of 600 RVR or greater. AA Ops Specs require TDZ report of 1200 RVR or greater and the rollout transmissometer must be reporting. Since the Mid RVR may be substituted for rollout RVR, if the Canadian 1200 RVR requirements are satisfied, AA Ops Specs requirements are also satisfied.
  5. Required RWY Lighting - HIRL, TDZ, and CL. For exceptions see Reduced or Inoperative Lighting below.
  6. Required Approach Lighting - ALSF 1 / 2 (Foreign: HIALS). For exceptions see Reduced or Inoperative Lighting below. Sequenced Flashers may be inoperative.
  7. Decision height - Must be published on the approach chart, and must be identified by the radio altimeter.
  8. Aircraft and ground equipment - Items specified in the MEL, the aircraft operating manual.
  9. Use of autopilot or HUD (737) to DH is required.
  10. The crosswind component must be 15 knots or less, or the airplane's operating manual crosswind limitation, whichever is more restrictive.
  11. Minimum hours - Captain must not be restricted or must execute the approach in accordance with FAA exemption 5549 (Refer to Restricted Captains in Chapter 4.).
- B. RVR 1000 feet (300 meters) - Use of published CAT II minima as low as RVR 1000 is authorized by Ops Spec C059 with the following provisions:
1. Restrictions in paragraph A, above, are met.
  2. Both TDZ and Rollout RVR reports are available. (Mid, or Far-end substitution for Rollout report is authorized.)
  3. Approach must be flown using autoland to touchdown or HUD Mode AIII (737) to touchdown.



## C. Reduced or Inoperative Light Provisions

1. Reduced Light Requirements. Ops Spec C059 authorizes the use of charted CAT II ILS approaches without installed ALSF / HIALS approach lights (MALSR, acceptable substitute), non-installed TDZ, and / or non-installed centerline lights (HIRL always required). Other than the reduced light requirements, all other requirements of preceding paragraph "A" must be satisfied. **Approach must be flown using autoland or HUD Mode AIII to touchdown.** These approaches will be identified in the briefing strip with one of the following notes:

- *'Reduced Lighting: Requires specific OPSPEC MSPEC or LOA approval and use of Autoland or HUD to touchdown.'*
- *'Procedure does not meet ICAO standard for ALSF / TDZ / CL lighting systems; Authorization to conduct this approach requires specific ops spec approval or Letter of Authorization (LOA) for this runway. -'*

2. Installed but Inoperative Lights. If TDZ or CL Lights are inoperative on a CAT II instrument approach runway, Ops Spec C059 authorizes the use of the approach with the procedural provision: **Approach must be flown using autoland or HUD Mode AIII (737) to touchdown.**



## 10.3.5 Category III Approaches - Fail Passive Autolands

Reference: Ops Spec C060

- A. The DC-9 has a fail passive autoland system. 757, 767, and 777 aircraft have fail passive systems when operated in LAND2 configuration. Published Category III ILS approaches may be conducted with fail passive autoland systems subject to the following restrictions:
  1. Reported Touchdown zone visibility is no less than RVR 600 or no less than CAT III RVR minimums published on the approach chart if higher than RVR 600.
  2. Touchdown Zone, Mid, and Rollout transmissometers must be operational.
  3. Mid transmissometers must report RVR 400 or greater.
  4. Touchdown Zone and Mid transmissometers are controlling; Rollout is advisory.
  5. Lowest authorized DH, identified by the Radio Altimeter, is published in the Operating Manual.
  6. Required runway lighting: HIRL, TDZ, and CL.
  7. Required Approach Lighting - ALSF 1, ALSF 2, SSALR or foreign equivalents such as HAILLS. Sequenced Flashers may be inoperative.
  8. Aircraft and ground equipment required for Category III approaches is specified in the aircraft MEL and Operating Manual.
  9. Maximum wind value as specified in the Operating Manual.
  10. Category III approaches must be autolanded.
  11. The Captain must not be restricted and cannot use FAA Exemption No. 5549. This requirement may not be reduced by landing credit (Refer to Restricted Captains in Chapter 4).
  12. The Captain must have made two actual autolands in the aircraft. These should be accomplished prior to accumulating 100 hours as Captain in the aircraft.



## 10.3.6 Category III Approaches - Fail Operational Autolands

Reference: Ops Spec C060

- A. The 757, 767, and 777 are equipped with fail operational autoland systems. Published Category III ILS approaches may be conducted when the reported visibility is as low as RVR 300, subject to the following restrictions:
  1. Reported visibility is no less than RVR 300 or no less than CAT III RVR minimums published on the approach chart if higher than RVR 300.
  2. Touchdown Zone, Mid, and Rollout transmissometers must be installed and all reports are controlling.
  3. One of the three installed transmissometers may be inoperative, and, if so, the two other reports are still both controlling.
  4. Alert Height is 100' and is identified by the Radio Altimeter.
  5. Certain Category III published approaches have a decision height.
  6. Required runway lighting: HIRL, TDZ, and CL.
  7. Required approach lighting - ALSF 1, ALSF 2, SSALR or foreign equivalents such as HAILLS. Sequenced Flashers may be inoperative.
  8. Aircraft and ground equipment required for Category III approaches is specified in the aircraft MEL and Operating Manual.
  9. Aircraft specific procedures and requirements in the Operating Manuals are followed.
  10. Maximum wind value as specified in the Operating Manual.
  11. Category III approaches must be autolanded.
  12. The Captain must not be restricted and cannot use FAA Exemption No. 5549. This requirement may not be reduced by landing credit (Refer to Restricted Captains in Chapter 4).
  13. The Captain must have made two actual autolands in the aircraft. These should be accomplished prior to accumulating 100 hours as Captain in the aircraft.



### 10.3.15 Autoland Flight Confidence Checks (FCC)

- A. The FAA Approved Lower Minimums Program (LMP) which allows CAT III autoland operations requires that a successful autoland be accomplished and reported at least once every 60 days. This validating autoland is referred to as a Flight Confidence Check (FCC).
- B. Reported autolands are tracked by FOS. Beginning 45 days from the last reported autoland, FOS will append a Special Message to the flight plan requesting an autoland be made and reported. If no autoland is reported within 60 days of the last reported autoland, MEL 22-90 will be posted in the E6 with the following notation – "Restricted to CAT I Weather Minima Awaiting Flight Confidence Check." This downgrades the weather minima, not the autoland system. An autoland should be accomplished when feasible, weather and traffic conditions permitting.
- C. After receiving the flight plan notification of a required FCC, the flight crew is responsible for completing this check as soon as possible. If the flight crew will remain with the aircraft for several legs or multiple days then this check should be accomplished within the footprint of the first duty period.
- D. A description of operational FCC requirements and restrictions is contained in each Aircraft Operating Manual.



### 10.3.16 Periodic Practice Use of Autoland or 737 CAT III HUD

- A. Captains qualified on aircraft types having autoland or CAT III HUD capability should make every effort to execute at least one such landing each month in the course of line operations in order to maintain familiarity and confidence with the system. These autolandings or HUD approaches should be made after considering factors including scheduled arrival time, traffic, etc. When conducting an autoland (including VMC) all CAT III crew coordination procedures must be followed to ensure all tracking and monitoring requirements are satisfied. All autoland / HUD approaches must be logged according to instructions in the Aircraft Operating Manual.
- B. Autolands may be conducted to CAT I / II / III designated runways provided:
  1. The procedure does not have a chart note or NOTAM which renders the localizer unusable inside the runway threshold.
  2. The localizer is not offset.
  3. If conducting an autoland on a CAT I only runway, the runway is not contaminated.
  4. Actual CAT II or CAT III approaches must be conducted on CAT II or CAT III runways, as appropriate.
- C. Sterile areas will not be protected if the weather is better than 800/2. Captains must exercise caution and disengage the autopilot in the event of a signal malfunction or aircraft deviation from glide slope or localizer.



### 10.4.2 Legality Table Ball Notes

Reference: Ops Spec C053, C059, C060, C074

- ❶ RVR is not required when visibility is 1/2 mile or greater, but if reported, RVR must be used. (Far End, if reporting, may substitute for R/O)
- ❷ CAT I ILS approaches to runways without TDZ and/or CL lights must be flown with F/D, coupled autopilot, or HUD to D/A or MAP.
- ❸ CAT II approaches that must be flown using autoland or HUD Mode AIII (737) to touchdown:
  - Charted approaches with RVR 1000 minimums.
  - Charted approaches with MALSR versus ALSF approach lights or without installed TDZ or CL lights.
  - Approaches to runways with inoperative TDZ or CL lights.
- ❹ For 757, 767 and 777 aircraft flown in "LAND 2" mode, plus all 737 and MD80 aircraft on CAT III ILS approaches, three transmissometer reports are required.
- ❺ For 757, 767, 777 aircraft, on CAT III ILS approaches flown in "LAND 3" mode, if one RVR report of the three normally required is inoperative, the approach may be initiated or continued with the two remaining RVR reports, (both controlling).



## 10.4 APPROACH LEGALITY TABLE

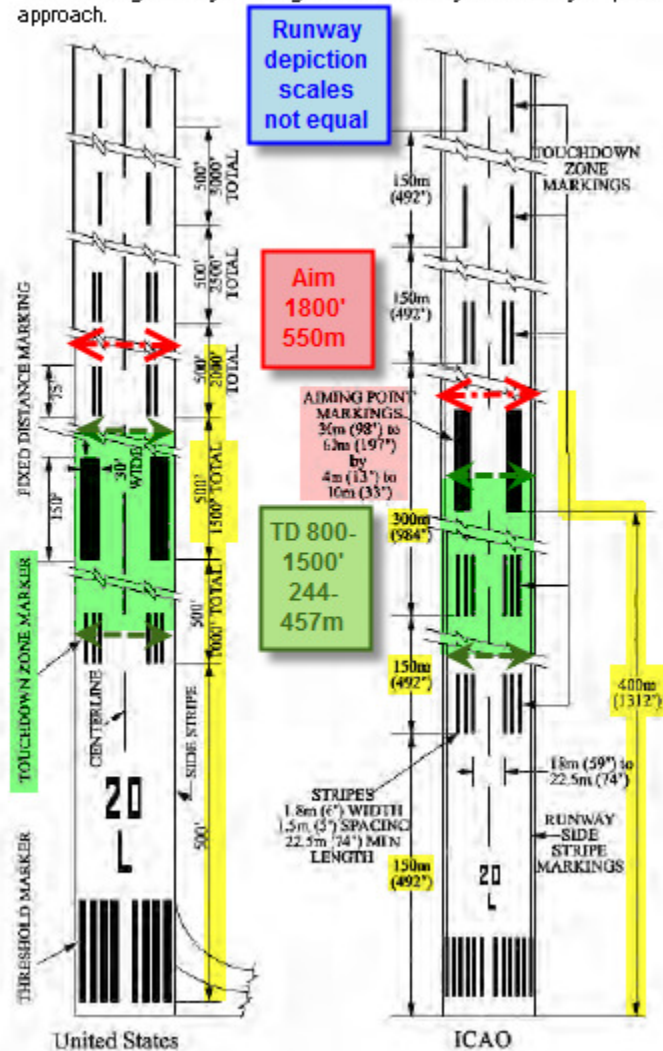
### 10.4.1 All Fleets Approach Legality Table

ALL FLEETS APPROACH LEGALITY TABLE								
CAT	Vis RVR	Meters	# Rpts.	Report Type & RVR	Transmissometer Status and Sub Options	Approach Lights	TDZ - Centerline Lights	Runway Edge Lights
I	3/4 or 4000	1200	0/1 ❶	TDZ 4000	❶ TDZ controlling (MID substitution OK) ( MID & R/O-advisory)	Not Required	Not Required	(Night) Edge Lights (N. or Day with RVR Minimums) HIRL
	5/8 or 3000	900		TDZ 3000		MALSR or SALSR		
	1/2 or 2400	750		TDZ 2400		MALSR or SSALR or ALSF I or ALSF II or HIALS	❷ TDZ and CL Lights	
	1/2 or 1800	550		TDZ 1800				
II	1600	500	1	TDZ 1600	TDZ controlling (NO substitution)	❸ ALSF I or ALSF II or HIALS  (Sequenced Flashers Not Required)	❸ TDZ and CL Lights	HIRL
	1200	350	2	TDZ 1200 R/O RPT	TDZ controlling R/O Advisory (MID or F/E = Sub R/O)			
	1200	350		TDZ 1200 MID 600	CANADA TDZ & MID controlling			
	❸ 1000	300		TDZ 1000 R/O RPT	TDZ controlling R/O Advisory (MID or F/E = Sub R/O)			
III	600	175	3 ❺	❹ TDZ 600 MID 400 R/O RPT	❹ TDZ - controlling MID - controlling R/O - advisory	ALSF I or ALSF II or HIALS (Sequenced Flashers Not Required)	TDZ and CL Lights,	
	300	75		TDZ 300 MID 300 R/O 300	TDZ - controlling MID - controlling R/O - controlling			

## LANDING ZONE

### Landing Runway Markings (Typical)

The following runway markings are for runways served by a precision approach.



### Visual Aim Point

#### OM1 Approach Landing GA 45.8 / 4-30-10

During visual approaches many techniques and methods are used to ensure main landing gear touchdown at the desired point on the runway. One of the most common methods used is to aim at the desired gear touchdown point on the runway, then adjust the final approach glide path until the selected point appears stationary in relation to the airplane (the point does not move up or down in the pilot's field of view during the approach). In first generation jet transports e.g., B-707, DC-8, this method is acceptable because of the small difference between landing gear path and eye level path. Flare distance accounts for the small difference in paths. Gear touchdown occurs very near the visual aim point. However, in today's larger airplanes, the difference in gear path and eye-level path has increased because of the longer wheelbase and the increased flight deck height. Consequently the main gear will not touch down on the runway at the selected visual aim point.

Visual aim points versus gear touchdown point differences increase as glide path angle decreases as in a flat approach. For a particular visual approach, the difference between gear path and eye level path must be accounted for by the pilot.

### Threshold Height

Threshold height is a function of glide path angle and landing getouchdown target. Threshold height for main gear and pilot eye level is shown in the Two Bar / Three Bar VASI Landing Geometry tables on previous page. Special attention must be given to establishing a final approach that assures safe threshold clearance and gear touchdown at least 1000 feet down the runway. Plan to cross the threshold at 50 feet.

### Approach Speed / Wind Additives

#### Approach Landing GA15.3 / 10-24-10

When using the autothrottle, position command speed to  $V_{REF} + 5$  knots. Sufficient wind and gust protection is available with the autothrottle connected because the autothrottle is designed to adjust thrust rapidly when the airspeed drops below command speed while reducing thrust slowly when the airspeed exceeds command speed. In turbulence, the result is that average thrust is higher than necessary to maintain command speed.

If a manual landing is planned with the autothrottle connected in gusty or high wind conditions, consider positioning the command speed to  $V_{REF} + 10$  knots. This helps protect against a sudden loss of airspeed during the flare.

If the autothrottle is disconnected, or is planned to be disconnected prior to landing, the recommended method for approach speed correction is to add one half of the reported steady headwind component plus the full gust increment above the steady wind to the reference speed. The minimum command speed setting is  $V_{REF} + 5$  knots. One half of the reported steady headwind component can be estimated by using 50% for a direct headwind, 35% for a 45° crosswind, zero for a direct crosswind and interpolation in between.

When making adjustments for winds, the maximum approach speed should not exceed  $V_{REF} + 20$  knots. The following table shows examples of wind additives with a runway heading of 360°.

Reported Wind Wind Additive Approach Speed

#### NOTE

Do not apply a wind correction for tailwinds. Set command speed at  $V_{REF} + 5$  knots (autothrottles engaged or disconnected).



# Flight Operations Technical Informational Bulletin

May 1997

Number 97-03

## Obstacle Clearance on SIDs

Aircraft climb capability on Standard Instrument Departures is more than adequate during normal, all-engine, operations. SIDs are designed so that a climb gradient of no more than 200 feet per nautical mile will provide obstacle clearance, or, if a steeper climb is required, it will be specified on the SID chart.

However, if an engine failure occurs while flying the SID two questions arise.

1. Has the flight path specified in the SID been analyzed for engine-out capability?
2. Have the TPS weight limits been adjusted to account for the terrain or obstructions on the SID if an engine fails?

### Obstacle Clearance Criteria

FARs require that operators adjust maximum allowable takeoff weights to ensure obstacle clearance following an engine failure at V1. The aircraft must clear all obstacles (man-made or terrain) in the flight path by horizontal and vertical margins specified in the FARs. The vertical margin is 35 feet at the end of the runway, increasing incrementally with distance from the runway.

The horizontal margin, which accounts for factors such as crosswind and piloting variables, begins with a width of 300 feet on either side of the flight path, increasing to 2000 feet for straight-out flight path, or 3000 feet for turning flight path.

If the engine-out runway analysis determines that a limiting obstacle exists in the straight-out path the takeoff weight must be restricted, or a special turning procedure must be provided to avoid the obstacle. This procedure will normally be published on an Ops Advisory page for the airport.

### TPS Obstacle Clearance Analysis

The TPS is programmed to adjust runway limited takeoff weights as necessary so that the engine-out performance will meet the obstacle clearance requirement.

The flight path for engine failure analysis is assumed to be along the extended runway centerline or the flight path specified on a special engine failure procedure.

In the event of an engine failure after the completion of the third segment climb (flap / slat retraction), the departure procedure (SID, radar vector, or climb on course) is not analyzed for engine-out obstacle clearance because of the infinite number of variables.

### Flying After the Engine Failure

- If an engine failure occurs at V1, obstacle clearance has been analyzed for a straight-out path or a special engine-out departure path. *If any other flight path is flown prior to the completion of the third segment climb (flap / slat retraction), obstacle avoidance is the responsibility of the flight crew.* Furthermore, after the completion of the third segment climb (flap / slat retraction) or the published engine-failure departure procedure, the flight crew becomes responsible for terrain avoidance.
- It is unlikely, but possible, that rising terrain in the takeoff path could result in an obstacle being below the required margin, but penetrating the GPWS envelope resulting in a "TERRAIN TERRAIN" or "TOO LOW GEAR" warning. Unless visibility is sufficient to assure obstacle clearance, it must be assumed that the GPWS warning is valid so escape procedures must be accomplished to the extent possible given the configuration and available climb capability.

- An engine failure after the airplane is established on a SID *may* require a climb gradient of 200 feet per mile (or higher if specified by the procedure) to assure obstacle clearance (this is about 800 fpm climb at 240 knots ground speed). At average takeoff weights our airplanes can generally maintain this climb gradient with an engine failure, however at heavy weights, especially with anti-ice on, the climb capability may be as little as 70-90 feet per nautical mile. If the necessary climb gradient cannot be maintained, the flight crew must be aware of obstacles and take whatever emergency action may be necessary to avoid them.

## Summary

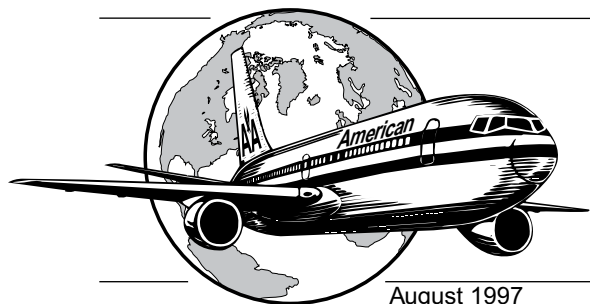
Runway analysis is a tool with inherent limitations. It is intended to ensure engine-out obstacle clearance from lift off through the third segment climb (flap / slat retraction).

After the "top of climb" waypoint, the Mountainous Terrain program will begin to analyze the route of flight and provide driftdown enroute engine-out alternates if the engine-out performance does not permit continuation of flight.

*In the event of an engine failure between the completion of third segment climb (flap / slat retraction) and the "top of climb", the flight crew must maintain situational awareness and avoid terrain.*

We have asked Jeppesen to provide terrain features on STARs and SIDs especially in areas of high, or rising, terrain. In the meantime, obstacle and terrain information can be found on approach charts, 10-1 area charts and other sources. The Air Traffic Controller, GPWS and Enhanced GPWS may offer additional information and warnings.

Captain Paul Railsback  
Managing Director  
Flight Operations Technical



# Flight Operations Technical Informational Bulletin

August 1997

Number 97-04

## Maximum Terrain Height

On September 2, 1997, flight plans will be modified to include terrain values in the body of the flight plan. TRR (Terrain) data will replace TRP column information. Terrain value information is the highest **actual terrain height**, 5 NM left and right of course between waypoints.

TRR (Terrain) values within the body of the flight plan are informational only. It is intended to be used as a pre-flight and situational awareness tool, not as an altitude to fly.

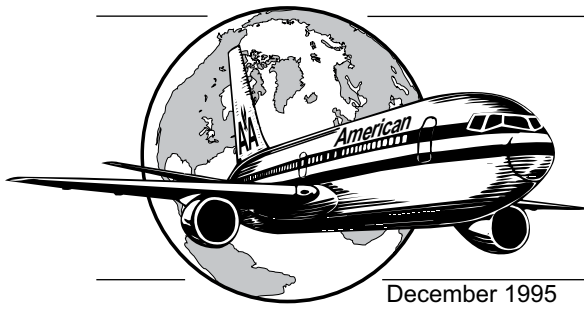
In the flight plan excerpt below, terrain is displayed in the TRR column. For example, on the segment between Lamar and Alamosa the highest terrain within 5 NM of track is 142, which in hundreds is 14,200 feet. Between Alamosa and Farmington, the highest actual terrain is 131 or 13,100 feet.

**TRR is the highest terrain height between waypoints.**

**TRR is not a safe altitude to fly.**

AAL1602000 FP AAL 551 L/B757/E 0469 ORD P1357 350  
ORD..MZV.J232.IRK.J96.SLN.J102.ALS.J110.FMN.J64.CIVET.  
CIVET1.LAX/0343

TO IDENT	FL	LAT WIND	LONG WCP	MC MH	MK TRR	GS TAS	TD I	SD TLDR	ST TTLT	SB TTLB
LAMAR		N38118	W102412	250	<b>800</b>	438	P02	0041	0005	0009
LAA	39	25024	M023	250	<b>042</b>	461	0	0813	0143	0171
ALAMOSA		N37209	W105489	242	<b>800</b>	446	P02	0157	0021	0026
ALS	39	20024	M015	240	<b>142</b>	461	0	0656	0204	0197
FARMINGTON		N36449	W108059	242	<b>800</b>	450	P02	0115	0016	0018
FMN	39	17022	M011	239	<b>131</b>	461	0	0541	0220	0215
TUBA CITY		N36072	W111161	245	<b>800</b>	453	P02	0158	0021	0025
TBC	39	19037	M008	241	<b>098</b>	461	0	0383	0241	0240



December 1995

Number 95-08

# Flight Operations Technical Informational Bulletin

## Mountainous Terrain Clearance Program

We have some good news and some better news. The good news is, soon we'll say "Adios" to more than 100 Flight Manual Part II Operations Advisory pages for South America. The better news is that in place of this mass of paper, we will implement the Mountainous Terrain Clearance Program (MTCP). The MTCP provides information in the body of the Flight Plan to insure compliance with terrain clearance criteria. In this article we will sketch a picture starting with a little history and follow on with a product review.

### History

Nearly four years ago, in response to our South American expansion, procedures were developed to meet FAR requirements for the loss of an engine or a cabin pressurization failure over mountainous terrain. The results of this effort were the AA Operations Advisory pages in the So Am/Caribbean Part II manual. From a production perspective, these pages are extremely labor intensive, very restrictive and based upon very conservative criteria. In other words, a maintenance and administrative nightmare which takes a "cast of thousands" to keep up to date. Another deficiency of the Operations Advisory pages is that they are not pilot friendly. It didn't take long before a need was identified to allow more flexibility and to provide a higher degree of accuracy. The light went on! Let's develop a dynamic system that is more flexible and supportive of pilots.

### Objectives

We sat down at the drawing table and established a set of objectives. They include:

- Evaluate and determine decision points, diversion airports and diversion routes (if required).
- Output to be based upon forecast weather, planned aircraft weights and flight altitudes.
- The ability to change routes and generate new ones in a timely fashion.
- Flexibility to substitute equipment types.
- Embedding all navigation and decision point information within the body of the flight plan
- *A straight forward, usable format.*

### How Does It Work?

Now that you have an idea of what we are trying to accomplish, let's go into a "nuts and bolts" discussion on how the whole thing works. The foundation of the program has two parts.

**First**, a computerized world-wide terrain database is resident in the Flight Planning System (FPS). This database is provided by the National Geophysical Data Center and validated by the National Center for Atmospheric Research.

**Second**, engine and pressurization failure performance data (provided by the aircraft manufacturer) is resident in FPS.

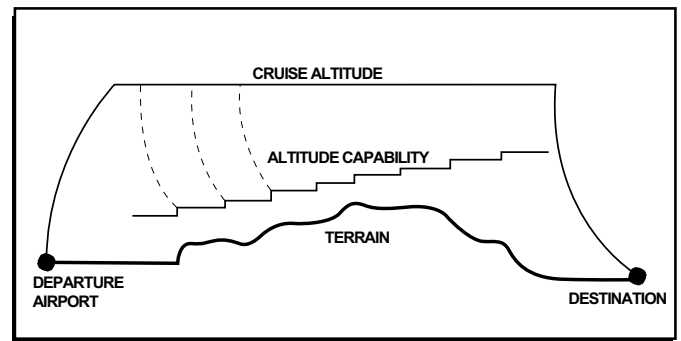


Figure 1

These two databases in concert with new programming provide the flexibility to analyze data for any aircraft on any route. This process takes place in three phases:

1. The computer program determines altitude capability for an engine loss (based on a given weight with anti-ice on) and ensures that 1000' of terrain clearance exists at the single engine level-off altitude. If that margin exists, no further checks are necessary. If the clearance is less than 1000', the program proceeds to the next phase (Figure 1).

2. Next the FPS performs a "Driftdown Analysis and Decision Point(s) Determination". This analysis checks to ensure all terrain is cleared by 2000' while descending. (Reference Figure 2 for the following example.

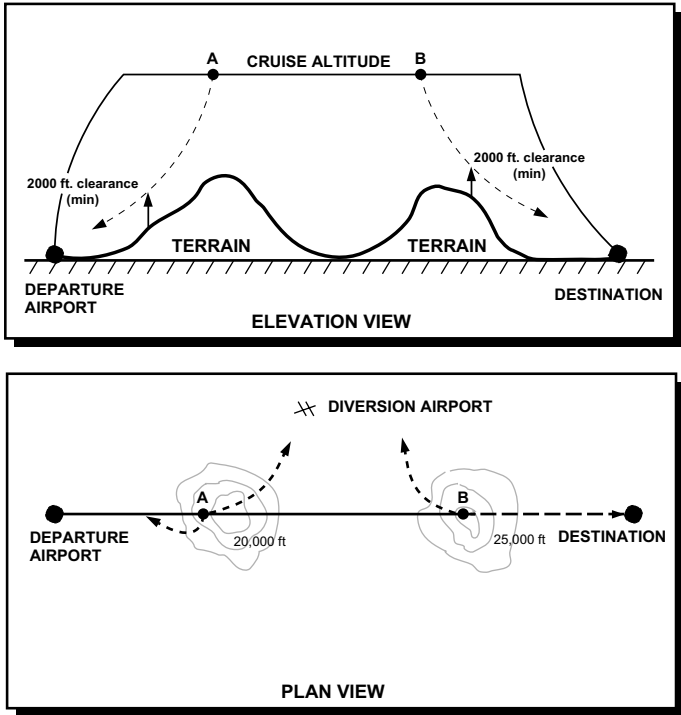


Figure 2

The computer determines decision points (A and B, Figure 2) based on the 2000' clearance criteria. Once determined, decision point A becomes the last point from which it is safe to return along your route to the departure airport. At (or after) decision point B, you can lose an engine and continue along the route of flight to your destination meeting terrain clearance criteria. (Note that the above two examples do not require a deviation from your flight plan routing.)

If an engine fails between A and B, terrain clearance criteria cannot be met proceeding either to the destination or to the departure airfield. In this case, the MTCP determines an alternate routing(s) which provides 2000' of terrain clearance enroute to designated diversion airports. This will ensure clearance exists even if your final level-off altitude is lower than the terrain along your route (i.e.- a 16,000' peak will be cleared at a minimum of 18,000').

3. Finally, a descent profile is calculated for a pressurization problem over critical terrain (Figure 3). In this scenario, the aircraft makes a descent from cruise

altitude to an intermediate level-off altitude which provides terrain clearance. After a specified period of time, the descent is continued to 10,000' prior to passenger oxygen being depleted.

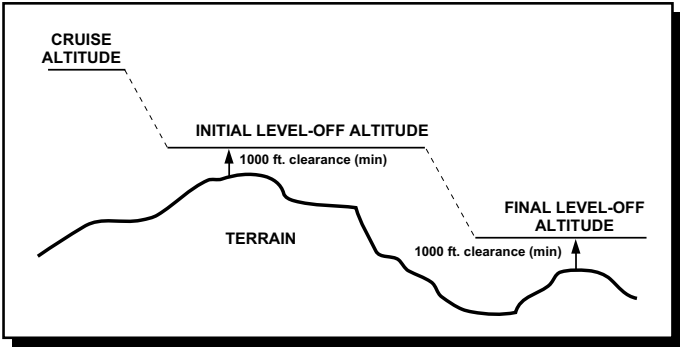


Figure 3

The pressurization and engine failure scenarios are considered separately. The most restrictive condition is used to generate the decision points and navigational instructions contained within the body of the flight plan.

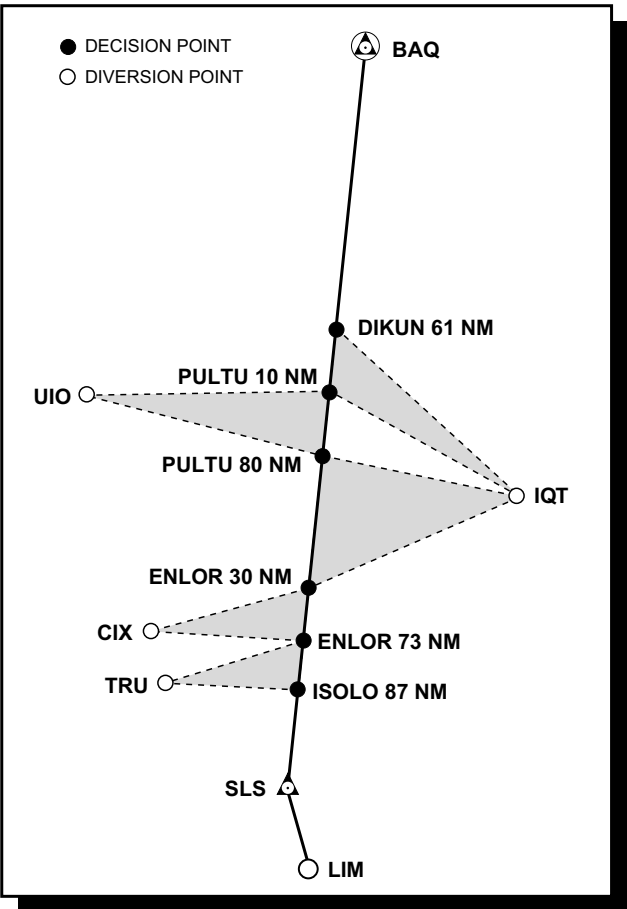


Figure 4

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## What does it look like?

A typical route and its associated flight plan output are illustrated in Figures 4 and 5. Figure 4 is a graphic representation of a flight plan from BAQ to LIM. Figure 5, on the back page, is the actual flight plan. If you experience an engine or pressurization failure prior to the decision point 61 NM south of DIKUN, return along the route just flown to the nearest suitable airport. Between this decision point and 10 NM south of PULTU, proceed direct to Iquitos (IQT). The shaded area between these points indicates that you can proceed direct to Iquitos and have terrain clearance. Similar logic applies to the remaining decision points.

As you can see, the flight plan output (Figure 5,) is straight-forward, usable and best of all, eliminates the associated "buff pages". Additionally, it is more accurate, efficient, and permits the dispatcher and the Nav Data group to create optimum routings or react to special needs (volcanic activity, inoperative nav aids, etc.).

## Implementation

Implementation of this program will proceed in several steps. Phase-in will consist of the following events (not in chronological order):

1. In-flight testing by selected line pilots and check airmen.
2. Posters in operations explaining the program.
3. Instructors will receive training on MTCP which will subsequently be incorporated into the training curriculum.
4. A Check Airman will be in operations during the start-up to answer questions about the program.
5. FM Part II and associated materials will be revised.
6. During the phase-in period, the MTCP will be constrained to the current "buff page" routes. The flexibility features will be fully operational after everyone is satisfied with the MTCP.

## Testing

During three months of testing the MTCP, several characteristics of the output have emerged. You may have occasion to question some of the decision point solutions in comparison to the "buff pages".

Decision points may shift from flight to flight on the same airway: The MTCP uses planned weights, altitudes, winds, temperatures, and the current navigation date base... various combinations of changes in these variables will result in the possible shift in decision points along the airways. Further, solutions will stay in sync with the nav data base current in the aircraft.

Diversion airports will change from flight to flight: The MTCP develops decision airport solutions that result from an assessment of both NOTAMS and weather. Also, diversion routings will be derived from the current navigation data base.

The MTCP will occasionally develop decision points along routes where the MEA is, perhaps, 8,000 to 10,00 feet. This can occur when the automated system, evaluating terrain in ten mile grids, determines that the terrain is limiting, where as the airway is about eight nautical miles wide. This conservatism occurs infrequently, and as ever, Captains are free to develop a better plan as the situation and judgement dictate. The MTCP develops a plan... not necessarily the only plan.

## Conclusion

Flight over mountainous terrain is challenging yet a very necessary part of our operations. The Mountainous Terrain Clearance Program allows us to take a step forward in efficiency while providing safety margins necessary for operations in a complex, demanding flight environment. In addition, it reduces the administrative workload in the cockpit and permits flight dispatch to tailor and fine tune flight plans to existing conditions.

---

- IFR AAL2187A/10 5BW/N650AA MIA LIM\* ALTN PIO FL270  
FUBO 41683 RLS FUEL 053865

FPL -- PLAN 1 OF 1 - RET 53 - CTLD CALC/RTE

\*\*\* EMERGENCY ENROUTE DIVERSIONS \*\*\*  
\*\*\* SEE ENROUTE DIVERSION INFORMATION BELOW \*\*\*

DIKUN	N01110	W075230	190	800	492	P09	0182	0022	0029
DIKUN	37 05030	P024	188	49	468	0	0809	0317	0304

\*\*\* ENROUTE DIVERSION INFORMATION \*\*\*

DECISION POINT N00109 W075336 - DIKUN 0061 NM  
PRIOR TO DECISION POINT - RETURN ALONG ROUTE JUST FLOW  
TO NEAREST SUITABLE AIRPORT INCLUDING DEPARTURE KMIA/MIA  
AFTER DECISION POINT DIVERSION ROUTE IS - SPQT/IQT

PULTU	N00040	W075348	190	800	492	P09	0068	0008	0010
PULTU	37 05030	P024	188	49	468	0	0741	0325	0314

\*\*\* ENROUTE DIVERSION INFORMATION \*\*\*

DECISION POINT S00058 W075365 - PULTU 0010 NM  
PRIOR TO DECISION POINT DIVERSION ROUTE IS - SPQT/IQT  
AFTER DECISION POINT DIVERSION ROUTE IS - SEQU/UIO

\*\*\* ENROUTE DIVERSION INFORMATION \*\*\*

DECISION POINT S01148 W075487 - PULTU 0080 NM  
PRIOR TO DECISION POINT DIVERSION ROUTE IS - SWQU/UIO  
AFTER DECISION POINT DIVERSION ROUTE IS - SPQT/IQT

\*\*\* ENROUTE DIVERSION INFORMATION \*\*\*

DECISION POINT S05346 W076388 - ENLOR 0030 NM  
PRIOR TO DECISION POINT DIVERSION ROUTE IS - SPQT/IQT  
AFTER DECISION POINT DIVERSION ROUTE IS - SPHI/CIX

\*\*\* ENROUTE DIVERSION INFORMATION \*\*\*

DECISION POINT S06169 W076410 - ENLOR 0073 NM  
PRIOR TO DECISION POINT DIVERSION ROUTE IS - SPHI/CIX  
AFTER DECISION POINT DIVERSION ROUTE IS - SPRU/TRU

ISOLO	N06270	W076420	190	800	488	P08	0083	0010	0013
ISOLO	37 00021	P021	190	49	467	0	0346	0413	0374

\*\*\* ENROUTE DIVERSION INFORMATION \*\*\*

DECISION POINT S007527 W076576 - ISOLO 0087 NM  
PRIOR TO DECISION POINT DIVERSION ROUTE IS - SPRU/TRU  
AFTER DECISION POINT - CONTINUE ALONG ROUTE TO NEAREST SUITABLE AIRPORT  
INCLUDING DESTINATION - SPIM/LIM

KOLSI	N08530	W077080	190	795	481	P08	0147	0019	0022
KOLSI	37 33023	P017	192	50	464	0	0199	0432	0396

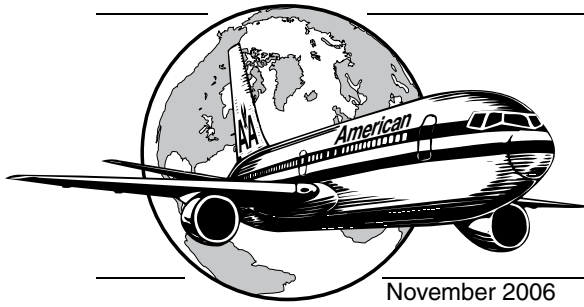
BGN DESCENT		190	795	475	P08	0086	0011	0013	
BOD	37 30029	P011	193	50	464	0	0113		0409

SALINAS	S11175	W077340	190			P15	0600		
SLS	17 28026	M001	195	50	287	0			

JORGE CHAVEZ	S12011	W077067	145			P15	0053	0023	0008
LIM	00 27011	P005	147	50	287	0	2349	0506	0417

RAMP WT	P03000	TIME	P00	FUEL	P1965	COST	P189	FL 370
RAMP WT	M10000	TIME	P03	FUEL	M1628	COST	M145	FL 370MQU410

Figure 5



# Flight Operations Informational Bulletin

November 2006

Number 2006-15

## Worldwide Terrain Clearance and Awareness

### Introduction

This bulletin is designed to highlight recent changes to the South America MTCP program and also to demonstrate tools and techniques that AA pilots have available for use in our worldwide operations. These tools and techniques will help ensure terrain clearance in the event of an aircraft depressurization or engine loss.

### Scope

This discussion applies to operations in all our worldwide operations, and is equally valid to crews overflying the U.S. Rockies, South America Andes, Afghanistan, Alaska or European Alps.

### Background

Prior to the June 2005 changes in the South America MTCP program, flight plans were checked for both engine loss and depressurization over their planned route. Decision points were generated to provide terrain clearance in the event of an unplanned descent. As the airline has expanded operations throughout the world, it has become apparent that we need a program that is applicable to all geographic areas, and that eliminates division specific procedures.

### Overview of Prior Changes

Depressurization calculations are no longer made along **any** route. **FLIGHT CREWS ARE REQUIRED TO DETERMINE WHEN THEY ARE FLYING IN A TERRAIN CRITICAL AREA, AND TO FORMULATE A PLAN TO ENSURE TERRAIN CLEARANCE WHEN FACED WITH A DEPRESSURIZATION.** In the event of a depressurization, the crew must decide the safest direction to fly, while following the operating manual/QRH depressurization procedure, until the pilots can determine the aircraft's position relative to the terrain, and then safely descend further.

### Designated No-Fly Zones.

Due to the limitation of PAX oxygen on the A300, 767, and 777 aircraft, there are areas where the aircraft cannot safely reach 10,000 feet (i.e. parts of the Andes) following a depressurization event within the duration of the oxygen supply. As a result of this limitation, flight plans have been reviewed by Operations Engineering, resulting in several "No-Fly Zones" (South America). These areas are identified on the SA HI 1,2 and 6 charts by red dashed-line boxes, and are bounded by FMC waypoint titles "NFZ01, NFZ02, etc." Those points now reside in the AA4, AA7 and AA8 databases, and if desired, can be built in RTE 2 or SEC FMS flight plans. No 767/300/777 aircraft will either be flight planned, nor allowed to deviate through these designated areas. Note that extensive terrain still exists outside the No-Fly Zones that will affect an aircraft's ability to level at 10,000 feet following a depressurization.

Terrain and Grid MORAS have been updated on HI and LO charts.

Engine-Out Driftdown: Decision points are included in your flight plan that provide terrain clearance based on engine-out altitude capability, if needed. The Engine-out descent profile is based on FMC calculated driftdown speeds to the FMC calculated engine-out driftdown altitude. Note that for some aircraft, such as the 767/777, on their normal routings, engine-out decision points may never normally be a factor.

## Techniques to Ensure Terrain Clearance in a Depressurization Event

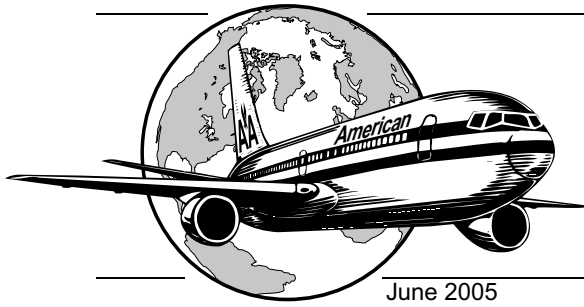
**Determine the Threat Area:** Using several of the tools at your disposal, such as Grid MORA's, flight plan TRR, shaded areas on HI charts, LO altitude airway MEA's, and Alaska terrain FMC points, determine when your aircraft cannot safely descend to 10,000 feet in the event of a depressurization event.

**Construct a Plan:** It is the direct responsibility of the Captain to ensure a plan is developed prior to any event occurring. You may well be unable to accurately read your chart after a depressurization or with the mask on. It becomes imperative that crews have **all** their applicable HI/LO charts out and available for use. Be aware that in some regions, such as South America, only Captains are issued relevant LO Alt charts. On FMC equipped aircraft, crews may desire to use the fix page to enter one or more bearings that equate to airways with MEA's that "fan" out from a waypoint. Similarly, multiple (if needed) LO Altitude airways may be placed in RTE 2 or the SEC flight Plan, to display a visual escape plan that overlays the active route.

**Execute Your Escape:** In the event of a decompression, execute the specific manual/QRH procedure applicable for your fleet while placing the aircraft either on the pre-determined escape route, or in a area of "safe" terrain. EGPWS displays may be an addition awareness tool to help increase crew awareness or amend your plan.

### In Summary

1. Determine when your aircraft is flight planned through threatening terrain
  2. Develop a plan of escape well prior to entry in to the danger area
  3. If a problem arises, execute your plan, utilizing all resources available to you, and proceed to an airport of your choice, depending upon aircraft condition and prevailing weather
  4. Always know your aircraft's position relative to the applicable terrain
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# *Flight Operations Informational Bulletin*

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## **Mountainous Terrain Clearance Program (MTCP) South America Operations**

### **Introduction**

This bulletin describes changes to the Mountainous Terrain Clearance Program as applied to South America operations.

### **Background**

In the past, South America MTCP decision points (DPs) were generated along a flight plan based on two scenarios, pressurization failure or engine failure. As a result, numerous DPs and alternate airports were generated for many flight plans. It was not uncommon to have at least a half dozen decision points, and as many enroute alternate airports for one flight plan.

### **New Program**

The goal of a new program is to reduce cockpit workload, place more tactical decision making in the cockpit, increase situational awareness, eliminate special procedures that apply to specific geographic areas, and standardize procedures. The program will be implemented on June 23rd. South America enroute charts and AA pages will be updated to reflect the MTCP changes in the 17 JUN 05 revision.

### **Program Changes Overview**

When the new program goes into effect the following changes will take place:

1. The depressurization calculation will no longer be performed by the FPS for South America. This will make the FPS consistent with the rest of AA operations around the world. This calculation has generated the largest numbers of DPs on the South America flight plans.
2. Designate No-Fly Zones. Due to the limitation of the PAX oxygen supply on the A300, 767 and 777, there are areas over the Andes Mountains where the aircraft cannot reach 10,000 ft. MSL following a depressurization event within the duration of the oxygen supply. As a result of removing the depressurization calculation, South America terrain has been analyzed by Operations Engineering and general terrain areas have been identified where a depressurization profile cannot be met within the time limit of the PAX oxygen system.  
  
For the A300, 767 and 777 aircraft, no flights will be planned through these areas. In reality, this is the case today. Additionally, ATC or weather reroutes through a "no-fly" zone should not be accepted.  
  
Because of the larger PAX oxygen capacity of the 757, this aircraft is not restricted by the no-fly zones. The 757 PAX oxygen system was designed to accommodate a depressurization and descent to 10,000 ft. MSL from anywhere in South America.
3. Terrain and Grid MORAs have been updated on the SA HI and LO charts.
4. No-fly zones will be depicted on SA HI 1, 2 and 6 by red dashed-line boxes. The boxes will be identified as a "NO-FLY ZONE". Chart legend will explain that the no-fly zone is for all aircraft except 757. The corners of the boxes will be identified with waypoint titles "NFZ01, NFZ02, NFZ03, etc". The lat / longs for these waypoints will be available to the flight crews to build on their nav displays (RTE 2 or SEC FMS flight plans). These waypoints have been incorporated into the AA4, AA7 and AA8 Nav database.

## **Engine-out Driftdown**

The MTCP program change will not affect engine-out driftdown planning or procedures. Decision points contained in the body of the flight plan will provide sufficient terrain clearance based on engine-out altitude capability. The engine-out descent profile is based on FMC calculated driftdown speeds to the FMC calculated engine-out driftdown altitude.

## **Depressurization**

The crew must decide the safest direction to fly and follow the current operating manual / QRH depressurization profile until the pilot can verify the aircraft position relative to terrain and safely descend.